COMPUTERWORLD

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NEWSPAPER

CW Photo by V.J. Farmer

Win 'Tool' — Help School

Modular Computer Systems, whose booth is shown here at the New York Caravan, will give away a $10,000 Modcomp II/20 computer at the end of the Computerworld Caravan. The contest is based on the best estimate of trading volume on the New York Stock Exchange on a given day and the winner picks a college to receive the computer. More coverage of the New York Caravan on Pages 5 and 6.

6,250 Byte/In. Density

IBM 3420 Storage More Than Tripled

By a CW Staff Writer

WHITE PLAINS, N.Y. – IBM added three new models to its 3420 magnetic tape system that can record data at the "densest recording capability yet offered," according to the company.

Using a new method called Group Coded Recording (GCR), the IBM drives can handle tapes containing a data density of 6,250 byte/in. compared with 1,600 byte/in. on earlier models of the 3420. The drives can be used with 370s ranging from the 135 to the 195.

An upgraded control unit was also announced – the 3803 Model 2 – which operates with both the earlier and latest 3420 tape units. The Model 2 includes the capability of correcting errors in one or two tracks "simultaneously while the tape is in motion," IBM said.

Data can be transferred to the CPU at speeds up to 1.25 Mbyte/sec compared with 320 kbyte/sec on earlier models of the 3420. Read/write access time on the new drives is about 1 msec, which is described as twice the speed of earlier models.

Data Segmented

The GCR method segments data written on tape into groups of characters to which a special coding character is added, And the higher density is based on a combination of a modified coding scheme, a smaller interrecord gap (called an interblock gap) and modified electronics and electromechanical components, IBM said.

Installed 3803/3420 tape systems can be converted to the higher densities in the field. The higher-speed systems can be equipped to handle both existing and higher densities so users can convert their

(Continued on Page 2)

Wise User Looks Before He Leases

By Ronald A. Frank
Of the CW Staff

NEW YORK – Recent developments affecting the leasing of 360 and 370 systems can benefit the user who plans ahead. Both the IBM announcement of a four-year 370 lease, without overtime, and the accounting changes recommended by auditors to write-off 360s by 1978 [CW, March 7] contain potential advantages for the wise user.

The IBM plan to sign up users for 48 months at the same rate as its regular monthly CPU rental also contains an interesting clause concerning future credits toward the purchase of the mainframe.

On the surface, the IBM long-term CPU lease eliminates the advantage used by leasing companies – i.e., no overtime charge for the user. But by requiring the

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user to sign at the same rates as the straight monthly rental, IBM is not really providing a cash discount except on the monthly bill for multishift sites.

Stiff Penalties

In return for signing up with IBM for the 48-month lease, the user is subject to stiff cancellation penalties. The charge for terminating a CPU lease is six-months' rental or 25% of the remaining costs of the lease, whichever is lower. And the penalty applies to "the removal of features, model downgrades and machine discontinuances," an IBM spokesman said.

The user who replaces 512K of IBM core with an independent memory would have to pay the penalty based on the incremental cost of the IBM core. A user who upgrades from a small 370 to a larger system from IBM would also pay the penalty, IBM said.

The user who upgrades within the same 370 model, by adding a feature during

(Continued on Page 4)

Court Faults IBM on Index, But Rejects Reconstruction

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – IBM and its lawyers were sharply reprimanded by a federal district court judge here last week for their role in the destruction of the index or computerized data base compiled in the IBM/Control Data antitrust case.

Chief Judge David N. Edelstein, who is hearing the government's antitrust suit against IBM, ruled that IBM had violated a pretrial order he had issued March 16, 1972, "in that it procured the destruction of a data base created by attorneys for Control Data Corp."

Furthermore, Edelstein, who is the chief judge of the U.S. District Court for the Southern District of New York, ordered IBM "to provide promptly to the court copies of any or all materials in its possession or control needed or useful in the reconstruction or restoration of such a data base."

He further ordered IBM to "produce immediately to the court any elements of the CDC data base in its possession or control that it did not cause to be destroyed."

The judge, however, rejected "at this time" the Justice Department request that IBM be forced to either reconstruct the data base or pay Justice to reconstruct the files.

He did, however, dismiss this part of the Justice request "without prejudice" which means that it can be brought up again at a later date by the Justice Department.

The Justice Department charge that under the settlement IBM had procured the data base destruction had been characterized by IBM attorneys as "inflammatory."

Edelstein noted that pretrial order num-

(Continued on Page 2)

One Society Expelled

Foundation Ills Continue

By Alan Taylor
Special to Computerworld

CHICAGO – The Computer Foundation, scheduled to take over the certification of data processors in July, was thrust further toward an open power struggle in which the Data Processing Management Association and the Association for Computing Machinery squared off against other participating societies, as the two controlling organizations moved to consolidate the powers of their self-appointed cochairmanships.

At a meeting here, DPMA's John Swearingen, acting cochairman, first reversed one of the decisions of the organizing committee, then he expelled one organization, Quality Data Processing (QDP), from committee membership.

QDP cofounder R.C. Stewart told *Computerworld* he was protesting the attempt to expel QDP, being quite certain that Swearingen did not have this power.

ACM later moved to drop the original idea of equal control of the foundation by the various societies.

Originally Accepted

QDP had attended the first meeting of the organizing committee, and had been accepted by the committee for eventual membership, after affirming it understood it might not be eligible for membership in the actual foundation.

"We believe," QDP's representative, Robert Sennet, said at the time, "that the importance of the work on the committee makes it worth all our efforts to help now, even if we might not later be qualified for full membership." QDP was then voted as a full member.

Sennet, after telling the committee how

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DP Science Fair Coming to NCC

NEW YORK A High School Computer Science Fair will be part of the 1973 National Computer Conference & Exposition, June 4-8, in the New York Coliseum.

A grand prize will be awarded for the most significant project displayed. Prizes will also be awarded in four specific areas – new applications of computers; design and construction of computers or components; programming; and mathematics of computation.

All projects must be suitable for display, according to officials. Both hardware and software projects are solicited and any programming language or computing equipment may be used.

In the case of software projects, graphical or poster displays highlighting key ideas should be used.

All entry forms must be submitted by April 1 to Professor Frank S. Beckman, chairman of the fair. The submission form includes details of the proposed project and must be signed by a teacher familiar with the student's work.

Completed project displays must be delivered to the conference by 12 noon on June 4. Prizes will be presented during the 1973 NCC. All high school students, including June 1973 graduates, are eligible to submit projects.

Additional information is available from Professor F.S. Beckman, Chairman, Department of Information Science, Brooklyn College, CUNY, Brooklyn, N.Y. 11210.

Requests Related Material

Court Rebukes IBM on Index, Rejects Reconstruction

(Continued from Page 1)

ber one, which required IBM and the Justice Department to keep all documents relating to electronic data processing, was entered into the court at the urging of IBM and that the IBM attorneys had actually written the order that they are now accused of violating.

On signing that order, he said, he had told IBM and the Justice Department, "I expect this order to be implemented precisely and in every possible way . . .

"I don't want a single document destroyed under any circumstances without the consent of this court."

He also noted he had told the attorneys that he would hold hearings any time they felt the order was too restrictive with regard to documents in the case.

And finally, Edelstein stated that the order had applied to any documents "directly or indirectly" in the possession of either of them.

But, he added, with IBM lawyers present the data base in the Control Data base had been destroyed over the weekend of Jan. 13-14.

Even though IBM argued that the documents were in another case, Edelstein found that "if IBM, directly or indirectly, procured the destruction of the documents and other material in question, IBM can be held responsible for that destruction."

The documents filed in the government case "convice (sic) the court that IBM procured the destruction of CDC's data base. It was destroyed at the request of IBM, pursuant to an agreement between IBM and CDC, and, therefore, IBM can be held responsible for its destruction."

The IBM claim that the data base was the work product of the CDC laywers is "without merit," Edelstein ruled.

A Big 'If'

If the documents had not been destoryed, he said, IBM could have asked him to rule on whether or not the Justice Department could use them and he could have determined if they really were the work product of CDC attorneys and therefore not admissible.

But, he said, "as matters now stand, the court can never know whether the materials destroyed were, in fact, work product."

Even though he did not grant the Justice Department request to make IBM pay for reconstruction of the index, Edelstein said: "By refusing to grant all the relief requested by the government, the court does not mean to suggest that it view's (sic) IBM's violation of this court's order lightly.

"Indeed, such unseemly behavior coming as it does from respected members of the bar of this court is particularly distressing. There appears to be no sound reason why counsel needed to act in this hasty manner. Prudence would have dictated a different course."

At the very least, the court should have been informed that IBM was getting the data base destroyed by Control Data, he said, noting that in the future he expects to be informed of any similar plans.

While the Justice Department refused to comment on the ruling last week, IBM said it was "disappointed in the judge's ruling relative the pretrial order number one and naturally we will comply with what he has asked us to do."

However, the firm would not estimate how many documents it will have to turn over to the judge under the ruling.

After inspecting those documents, he will decide which ones should be passed along to the Justice Department to help it in reconstructing the data base in the case.

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3420 Storage More Than Tripled

(Continued from Page 1)

tape libraries, an IBM spokesman said.

Three models of the 3420 have the higher density capability. Model 4 has a tape speed of 75 in./sec; Model 6 operates at 125 in./sec; and the Model 8 handles 200 in./sec. Access times are 2.3 msec, 1.6 msec and 1.1 msec respectively.

Extended Plan

The faster models are available under the extended term plan at prices ranging from $580/mo to $752/mo. Under the regular monthly rental plan prices range from $690/mo to $895/mo.

Customers who convert their tape systems to the faster models will not have to pay an installation charge. But it may take "seven to ten hours" to make the change, a spokesman estimated.

For users who now have 3420 systems on fixed term lease plans, the tape systems can be converted and the extended lease plan instituted without paying early termination charges. For these users, the 24-month extended term plan begins with the first monthly payment, and the fixed term plan requirements are cancelled.

Conversion Charge

For users who own 3420 systems a one-time conversion charge is applied. A typical field conversion of a purchased Model 3 drive to a Model 6 will cost $14,500, IBM said. Maintenance prices on faster drives for purchase systems could also be proportionately higher.

Purchase prices range from $43,000 to $65,970. First deliveries are scheduled for the fourth quarter of 1973, while field conversions will begin in the first quarter of 1974.

Arts-III Complete, Data Transfer Seen

WASHINGTON, D.C. – The production of all 64 computerized automated radar terminal systems (Arts-III) ordered by the Federal Aviation Administration has been completed.

Arts-III "unquestionably has been one of the most successful technical programs ever undertaken by the FAA," FAA administrator John H. Shaffer said in announcing completion of the project by Univac.

With the completion of the Arts-III program, most of the nation's air traffic system is now computerized, with Arts-III serving airports and local air traffic while the air route traffic control system serves long distance flights.

With the Arts-III units, aircraft near airports are automatically tagged with alphanumerics displayed on a CRT. This helps the air traffic controller sort out the flights on his screen.

In time, the FAA plans to link all of the Arts-III installations with the computerized air route traffic control centers for automatic data transfer between the facilities. In addition, the agency is developing a lower capacity Arts-III system for use in smaller airports across the country.

Mini Helps Lab Solve Bomb, Fire Crimes

WASHINGTON, D.C. – Two mini systems in the U.S. Treasury Department's Bureau of Alcohol, Tobacco and Firearms Crime Laboratory are helping solve crimes involving bomb fragments, firearms and other materials found at the scene of a crime.

The minis perform pulse height analysis on the materials under test, a system developed for the ATF Laboratory by Monitor Labs, Inc., San Diego, Calif.

One of the systems played a major role in helping solve a bombing of the Bank of America building in Santa Barbara, Calif. A ceiling tile from the building, with fragments of the bomb and traces of unburned explosives imbedded in it, was sent to the ATF Laboratory along with a pipe found in the suspect's garage and soil from his shoes.

The material was chemically treated and irradiated in a nuclear reactor. A pulse height analysis proved the fragments in the ceiling tile were made up of the same material as the pipe from the suspect's garage, and that the soil from the shoes matched soil from around the bank.

On this evidence the suspect was later indicted.

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- ☐ **Never has a big enough budget.**

370 Users . . . Ampex Offers These Problem Solvers

Mainframe memory enhancement for IBM 370 models 135, 145, 155, 165, 158 and 168.

The ARM-3360 is the Ampex memory enhancement for IBM models 155 and 165. It will expand a 155 to 2 megabytes and a 165 to 3 megabytes of total Ampex memory without any CPU or software modifications. This can save IBM 370/155 users as much as $140,000 (depending on the computer model). Operating speed and size of this proven dependable main memory are the same as the IBM 3360.

ARM-158 or 168 semiconductor memories will be available for users of either IBM 370 model 158 or 168 virtually upon delivery of the CPU.

The Ampex ARM-135 is a semiconductor memory enhancement that equals IBM-135 enhancement limits of 240K bytes in a compact 30″ x 30″ x 60″ module. Equally important, Ampex also offers 48K and 96K byte modules for those who need some, but not maximum, memory capacity. Other significant features: The ARM-135 has the same transient power protection as IBM, its own test panel (unlike IBM) so you can test off-line, and is designed to take maximum advantage of IBM diagnostic routines. And you save up to 40% without sacrificing any performance.

The Ampex ARM-145 also is a semiconductor memory offering expansion to 512K bytes of memory. A real space saver, the ARM-145 stores up to 352K bytes in a single 24″ x 60″ x 60″ cabinet. The ARM-145 has the same transient power protection, the same error-correction circuitry as the IBM 3345, its own test panel, and will take maximum advantage of IBM diagnostic routines . . . all at significant dollar savings.

Tape drives. The biggest news since Ampex pioneered tape recording is the new two-in-one configuration for the Ampex TC-38/TM-34 tape subsystem. Now you can reduce the amount of space required for tape drives and controllers in your DP center by nearly 50% . . . *or* double the number of drives without allocating more space. You get two high-performance 3420-compatible tape drives with data rates to 200 KB in a single cabinet, only a little larger than one individually mounted tape drive. But space reduction is only the beginning. The autothread on the TM-34 now is equipped with an exclusive "halo of air" that vastly improves threading without the reel-surround cartridge. The tape will literally thread itself from any position. Furthermore, the TM-34 has an automatic reel latch that forever eliminates manually operated locking levers or buttons. And, of course, this drive has a radial interface for operation with either the Ampex TC-38 or the IBM 3803 controller. Format configurations include any combination of 9-track, single or dual density, and 7-track with data rates from 60 to 200 KB.

And, of course, the TM-34 is also available as a stand-alone unit with data rates up to 320 KB.

Disks. Whether or not your 370 has ISC, Ampex disk drive systems will save you money and space. Compatable with either the 3830 or the 3333, one Ampex controller will handle 16 drives with a total storage capacity of 1.6 billion bytes. That's only part of the story. Add plug interchangeability, average access time of 28 milliseconds, convenient top loading, read-write compatability, storage of 100 million bytes per drive, dual channeling and faster starts and stops. And you save 15% with the Ampex DS-330 system.

360 Users . . . Ampex Offers These Problem Solvers

Mainframe memory enhancement. For IBM models 22, 30, 40, 50, 65, and 67. ARM-22 expands the 360/22 to 64K; ARM-30 can expand the 360/30 to 128K; and ARM-40 can expand the 360/40 to 448K. The ARM-50 works to 1½ megabytes, and the ARM-2365 is designed for use with IBM models 360/65 and 67.

Mainframe-ECM. Equipped with a semiconductor cache memory, the standard ECM operates at the effective speed of the IBM 2365 mainframe memory. It is the most economical 1 to 8 megabyte replacement for the 2365. For the model 50, ECM still is available with a 2.5 microsecond cycle time.

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Tape drives. There's no space-saving system on the market to compare with the new Ampex two-in-one configuration. Everything we've written about Ampex tape drive for IBM-370 systems is equally true for 360 systems. So, why not expand the capabilities of your IBM-360 and save the expense of starting all over again with a 370?

Univac Users . . . Ampex Offers These Problem Solvers

Mainframe memory enhancement. The ARM-1108 operates at the same speed and is completely compatible to 1108, 1106 and 494 systems operating with Exec 2, Exec 8 or OMEGA. Furthermore, this memory enhancement has a built in MMA to facilitate use in multi-processor environments. No minimum Univac memory is required.

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Prospective Lessee Looks Carefully Before He Leases

(Continued from Page 1)

the four-year lease, has two choices. He can pay the regular monthly fee plus 15% extra each month, or he can pay the monthly rate without the 15% and extend the life of the lease according to a complicated IBM formula.

Purchase Credits

Under the new lease plan, the customer can accumulate credits of up to 50% of the purchase price at the end of four years. Previously IBM provided a more limited credit to monthly rental users, allowing them a total of 12-months' rental to be applied toward a purchase.

The real value of the 50% purchase option four years from now is open to question. Some leasing sources see the IBM credit as a kind of market support. They say IBM is affirming that the 370 will be worth at least 50% despite any new announcements made to obsolete the equipment. Others see the 50% as being below the value that would normally be expected.

But most residual lease values are based on a 10% or 11% depreciation each year, on a typical eight-year lease. So the 50% purchase guarantee is probably below the value that would have been carried by independent leasing firms. The third-party firm would probably have shown a

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value of 57% or 58% and the user might have to pay the difference as a termination fee.

For the user this can mean that the residual value projected by the third-party lessor is greater than the market value "for a considerable portion" of the term of the lease, according to one industry spokesman. It is more likely the leasing firms will adjust their residual values to match IBM's.

Third-Party Savings

But the user who chooses a third-party lease can also save on his rentals. On a five-year package lease plan from Itel, a 370/158 user would save as much as $500,000 compared to the four-year IBM plan, according to Dan Elliston, director of financial leasing at Itel.

The user who signs with a third-party firm can probably save an additional 30% over IBM 48-month lease rates. He can, in effect, "save up" the purchase price of the system. And if he decides to purchase after four years, the third-party leasing company will probably allow him to convert at the projected market value of 50% set by IBM. In the interim, the third-party lease customer can sublease his system, an option not available to IBM CPU lessees.

The user who plans ahead has to save "only" 12.5% per year (anything additional is gravy) with the third-party leasing company in order to make his projected purchase pay for itself.

Most leasing companies give the user a larger discount but also require their customers to sign up for periods ranging from five to eight years.

360 Benefits

The accounting write-off of 360s by 1978 can provide users with computing power that costs them almost nothing to operate. Purchase users have to depreciate their equipment by a certain percentage each year. And this depreciation offsets potential profits.

So a machine carried on the user's books at zero value costs only the amount of money required to run it. These items include electricity, maintenance and similar fixed charges.

In this environment, the user is free to add enhancements to his "obsolete" system at relatively low cost. Such features as the CHCS Accelerator [CW, Feb. 28] and a virtual capability such as the DAT box [CW, Jan. 31] could be financially justifiable to these users.

Most users realize the functional utility of a 360 will not cease simply because of an accounting procedure. And the 360s will probably be very favorably priced beginning in 1979, for the user who is willing to "make do."

If this approach seems far-fetched, then today's users who are still running 1401s and 7094s must be all wrong. The fact remains that functional utility, or the ability of a CPU to do the job, rests in the eyes of the user.

By continuing to strive for technical obsolescence with continued new products and systems, IBM may be grooming a whole new class of users.

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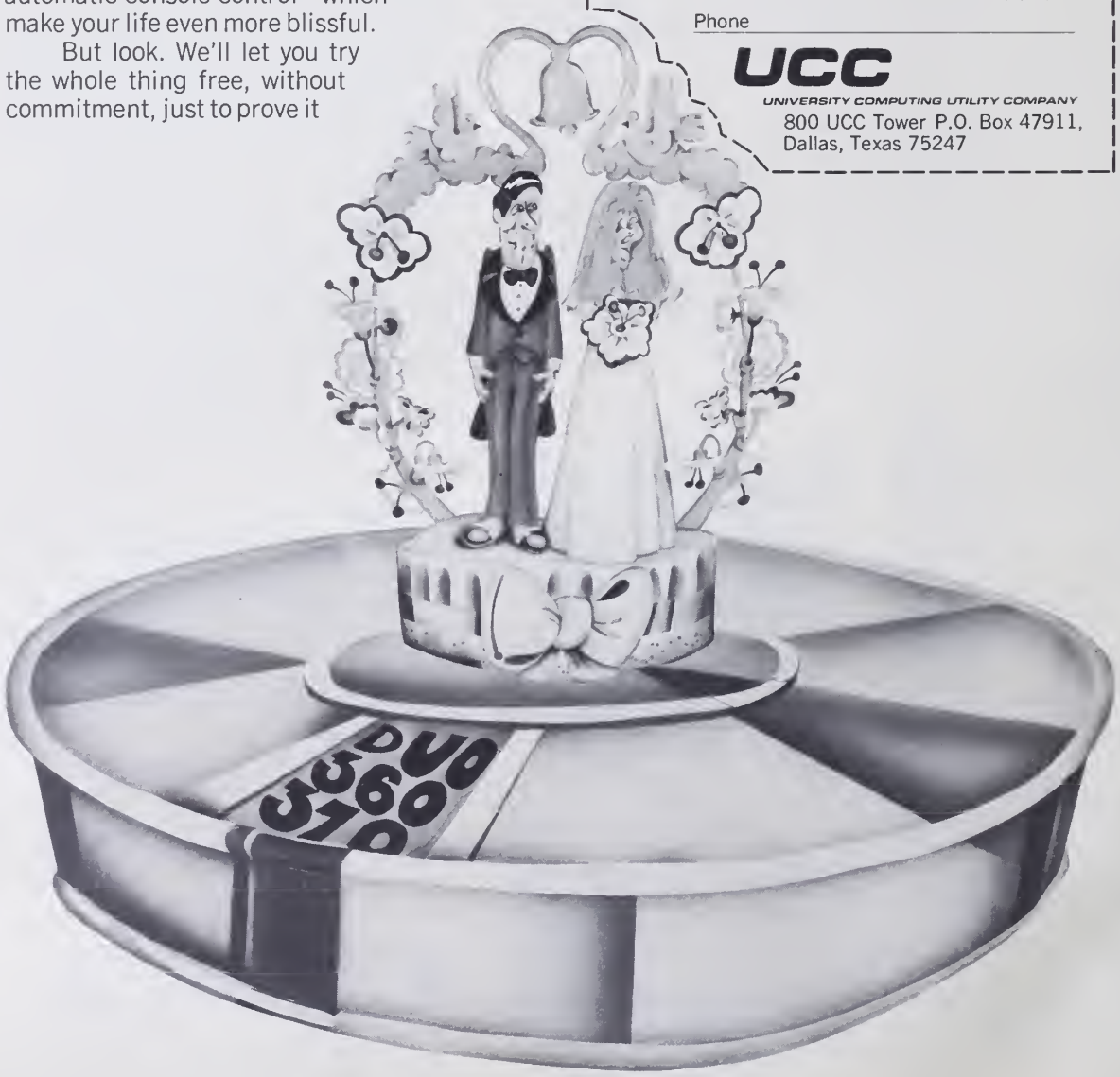

DP Foundation Ills Continue to Increase

(Continued from Page 1)

QDP was going to hold public meetings to keep the profession aware of what was happening, was nominated for the chairmanship of the public information subcommittee. Instead, as Sennet told QDP's first public meeting early this month, his group was expelled by Swearingen.

According to Sennet, Swearingen never gave any authority for the expulsion of QDP nor for his own authority to make such an expulsion. "It is just the same replay that we have heard at each meeting," Sennet said.

"We currently are a local organization," Sennet continued, "and we would be in a very effective position to be able to monitor the operations of the foundation, and the influence of DPMA on foundation affairs on behalf of the ordinary practitioners. Perhaps that is what they are afraid of. I do not know, but they are certainly afraid of something."

At the foundation meeting ACM's John Harris asked the organizing subcommittee, of which he was recently appointed chairman, to drop the recommended "equal votes for each society ruling," a provision which had been specifically included in the recommendations of the ACM/DPMA committee.

Harris called for a weighted set of criteria with the largest society getting the most votes.

Also, the Society of Certified Data Processors' representative, Marc Greenberg, who had been nominated by the organizing committee for chairmanship of the legal subcommittee, found that although the committee had been approved in the minutes, it had been abolished by the foundation cochairmen acting jointly. Its functions had been transferred to the organizing committee headed by John Harris, Greenberg said.

DP Up Down Under

CANBERRA, Australia – The number of digital computers in use in Australia increased by 363, or about 30%, during the year ended June 30, 1972, according to the Federal Department of Labor and National Service.

In June there were 1,594 computers in operation in Australia and another 339 were on order.

Users Say Bell Attitude, Service Ring a Sour Note

Caravan/73: New York

By Michael Weinstein
Of the CW Staff

NEW YORK – One of the biggest problems voiced by attendees at a Caravan/73 panel on data communications here concerned the "indifferent" attitude of AT&T toward user problems.

AT&T salesmen have no incentive to reduce the cost of users' communications services, the users complained.

"The salesman is paid in relation to the amount of equipment used," Grant Morris of Johnson & Huggins stated. "Many times he is not personally involved in the account and thus has little interest other than increased revenues for AT&T."

Another user expounded on this problem by noting that AT&T does not lease equipment on any term basis.

"It is possible to order something, have it installed on Monday, call them back and have it ripped out on Friday. In this environment, how do you expect the salesman to develop any loyalties to the user?" he asked.

Another user said he called in an AT&T engineer to add IBM 3735 terminals in series.

The engineer told him this was impossible under AT&T policy and he would have to use a switch, the user related.

This manual switch would enable either of the 3735s to be used on-line but not at the same time.

However, another user told him the switch was not needed and recommended an outside vendor who could align the IBM units on one modem in series.

He took the user's advice and has had no operational troubles ever since, nor has he heard from the AT&T engineer, he explained.

AT&T's phone services also came under attack and Louisville, Ky., had the questionable distinction of being chosen by users of nationwide communications networks as having the worst phone service in the nation.

One user claimed that telephone service out of Louisville was so bad, his company had to move its data processing center out of Kentucky.

(CW Photo by V.J. Farmer)

Talking shop and "kicking the tires" was a big part of the New York Caravan. Caravan officials estimated the three-day attendance at over 4,300, bringing the three Caravan total so far to 10,300. Computer Caravan/73 moves on to Atlanta March 13-15.

Mainframers' Software Lacking

NEW YORK – Hardware vendors are generally a poor source of software, simply because they are in business to manufacture and sell hardware, Joseph T. Rigo told a Computer Caravan/73 panel on software evaluation.

They have nothing against making a little extra on the side from selling software. But Rigo, assistant vice-president at Bankers Trust Co., ranked this source of income on the same level as "the Coke machines" in the employee lounge.

Most of the software from the manufacturers is in the area of direct support for their hardware, he contended.

Rigo related experiences with his former employer, IBM, detailing documents that were put together by anyone proposing a new program product.

"The first thing they had to do was indicate briefly what they wanted to develop. Next, they had to specify, in detail, what hardware products it would help to sell.

"After that, they could go on to such miscellaneous subjects as cost and schedules," he remembered.

But even IBM had limits on the number of development projects it could support, Rigo related.

"It was understood that priority would go to utility programs, operating systems, compilers and on-line terminal operations that are close to the heart of the equipment operations.

"The important thing," he said, "is that we, as buyers, must be able to take care of ourselves. We must be able to evaluate the competing products – just as we do for any other purchase," Rigo cautioned.

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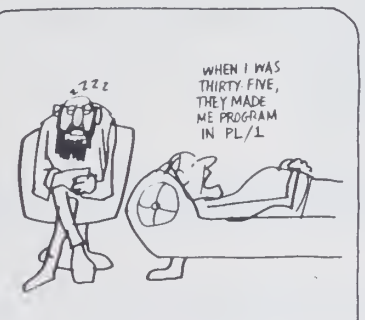

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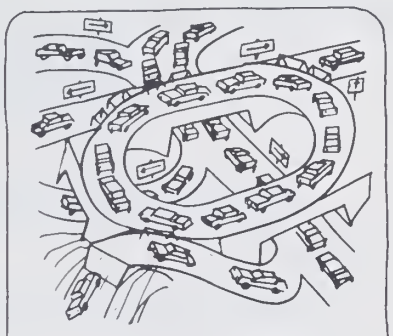

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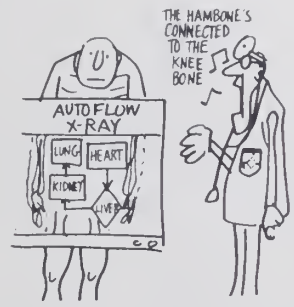

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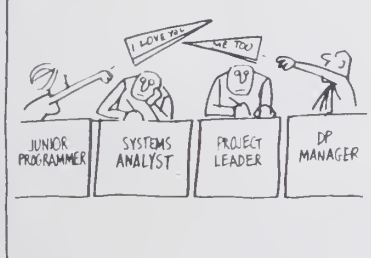

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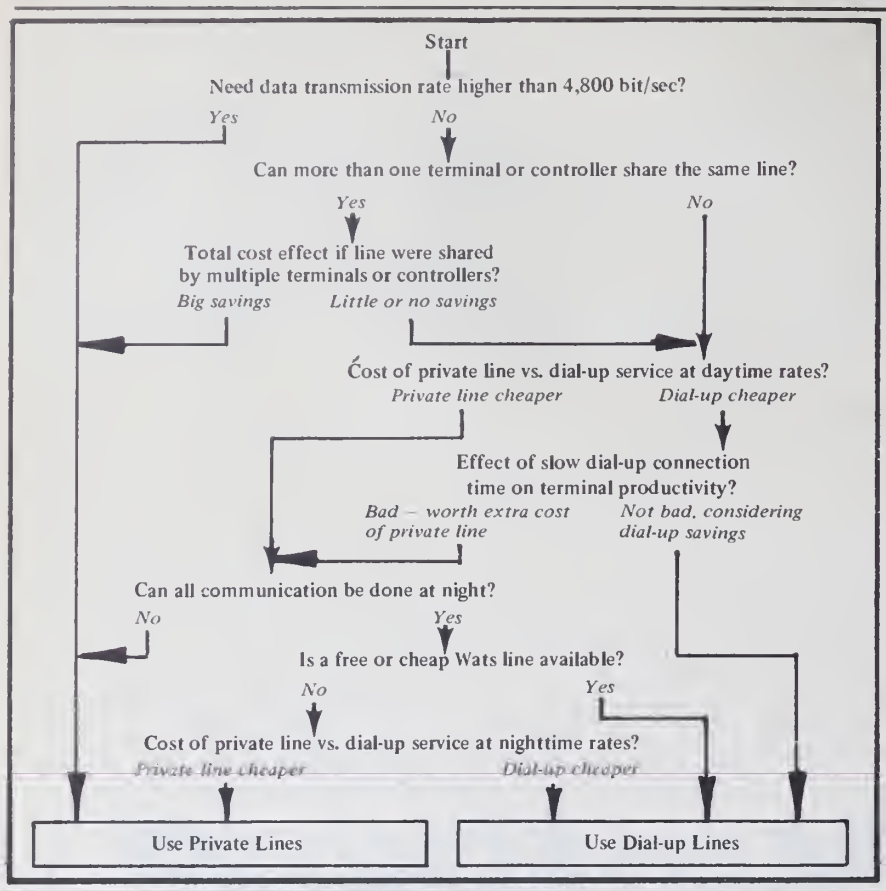
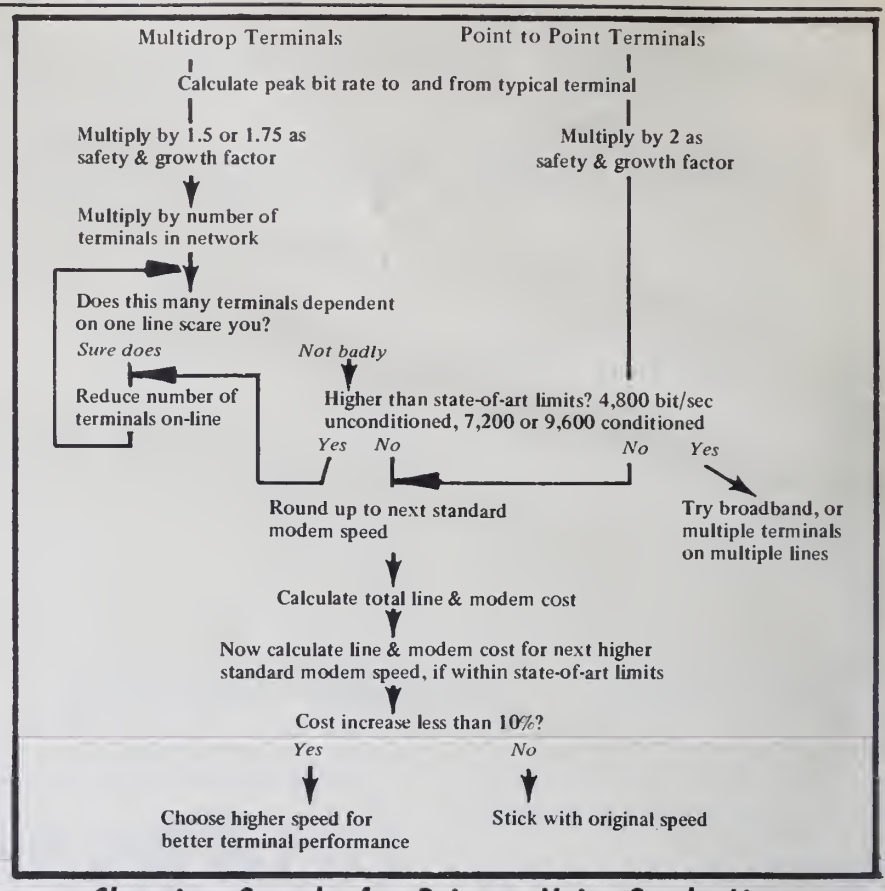


Choosing Private or Dial-Up Lines



Choosing Speeds for Private Voice-Grade Lines

Selecting Communications Lines? Flowchart Needs

By Michael Weinstein
Of the CW Staff

NEW YORK – Flowcharting communications needs can help users choose between dial-up or private lines and choose speeds for private voice-grade lines.

This message with two sample charts was presented by Jim Beck of American Standard, Inc. at a Caravan/73 panel on data communication.

The first chart deals with choosing between private or dial-up lines.

Following this chart down, if the user needs transmission rates higher than 4,800 bit/sec, he is compelled to use private lines as present dial-up service will not support rates higher than 4,800 bit/sec.

Assuming the user needs a rate of 4,800 bit/sec or less, the next step is to determine the use of the line.

If more than one terminal or controller share the line, the user should then analyze potential savings. If the savings are large, this may justify a private line. If the savings are not large, the user should establish the costs of private lines vs. dial-up service using peak time hours.

Caravan/73: New York

If dial-up is cheaper, the user must then take into account the effect of slow dial-up connection time on terminal productivity.

If terminal response time will not be adversely affected, dial-up services are probably best.

Night Work

However, if terminal response is too slow under dial-up or it is decided that private lines are cheaper, the next question is whether communication can be done during the night.

If the answer is no, the user is again forced back to choosing a private line.

If the answer is yes, the question then arises as to whether the user has access to a free or cheap Wats line.

If no Wats line is available, the final consideration is whether the amount of data to be transmitted makes a dial-up arrangement more expensive than a private line.

Choosing Line Speeds

The second user flowchart presented by Beck concerned choosing speeds for private voice-grade lines.

Starting with the type of terminal the user is operating, calculate the peak bit rate to and from a typical terminal.

Multiply this by the appropriate growth and safety factor because users will find, as their communications become more stable, usage will generally increase above initial projections, Beck asserted.

If using multidrop terminals, the user must determine for himself whether the number of terminals dependent on one line is too risky.

If the user is afraid of a line failure and cannot afford to have the large number of terminals dropped, he must reduce the number of terminals.

This reduction must continue until the user is reasonably satisfied that a line drop will not cause extreme difficulties.

From this point users will be able to calculate the cost of increasing modem speed. If the cost increase is less than 10%, the user is advised to choose the higher speed for better performance. Otherwise he should remain with the original speed.

Search Covers Food Data

CHICAGO – An expansion of computer literature searches to include the *Food Science and Technology Abstracts* data base was announced by the Computer Search Center of IIT Research Institute.

This data base is generated by the International Food Information Service in Germany and covers journals and patents dealing with all aspects of food science and technology.

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Upgrade Saves L.A. Service Bureau $35,000/Mo; 43 Agencies Benefit

By Marvin Smalheiser
CW Correspondent

LOS ANGELES – An equipment upgrade tied to a massive relocation has yielded savings of at least $35,000/mo for the Los Angeles Data Service Bureau (DSB), one of the nation's largest municipal centralized computer centers.

A move from widely scattered facilities in City Hall to a 30,000-square-ft computer facility made possible a switch from two IBM 360/50s and a 360/40 to two 370/155s with a savings of $20,000/mo.

Another $15,000 was saved because the increased capacity of the new machines permitted reduction of overflow that was being farmed out.

Tug Tamaru, general manager of DSB, also said "considerable" savings are anticipated with a switch from 24 IBM tape drives to 24 Storage Technology Corp. (STC) tape drives.

Other benefits of the upgrade have been increased turnaround and a significantly larger capacity for the city's big law enforcement system, he said.

Tamaru said the 155s are fully duplexed, as are the I/O units. "It gives us a lot more flexibility. We can do almost anything at almost any time."

DSB also gets added versatility with six IBM 2314 disk drive spindles which are switchable between two Systems Engineering Laboratories (SEL) 810Bs and the 155s through a channel selector adapter.

The SEL 810Bs are being set up for a Fire Command and Control System and it was preferable to link them with the 2314s rather than with DSB's IBM 3330s, Tamaru said.

The biggest problem of the upgrade was getting all 7,000 programs running under OS and DOS converted to 370 OS in the time available, according to William D. Porter, deputy general manager of DSB. But the move was made in time and at a cost under the $50,000 which had been budgeted for the move.

Programmer Rob Wilson tests out administrative programs.

The bureau services 43 of the city's 45 departments with a staff of 375.

Its biggest customer is the police department which has the top partition, or 30%, of one of the 155s dedicated to it.

Much of that capacity is for the regional on-line Automated Want and Warrant System (AWWS), a city-county system enabling any police officer in the region to inquire from the field on the criminal status of any vehicle or individual.

The move and the switch to larger equipment permitted the bureau to add three cities to the 55 cities on the system, which now has over one million AWWS records on-line and processes one million transaction/mo.

The expansion also reduced the system's response time from 10 to 12 seconds to five to six seconds.

Tamaru and Porter said the customers have been extremely pleased with the changes because now they can add systems and applications that have been waiting in the wings for several years.

The users are involved in work ranging from planning and community analysis with the aid of computer data to earthquake studies and computerized inventories of the animals in the city zoo.

Many of the systems developed for the users are innovative; AWWS was one of the earliest to use a front-end communications concentrator for message switching, instead of trying to do it all with a 360, Tamaru claimed.

Tamaru said the enormous library system is "one of the most sophisticated library support systems in the world."

It will be completed in about two years but there are now one million records on file and three to four million records in the catalog file.

A computerized book order and purchase system uses teleprocessing to order books every morning

A system to keep track of millions of dollars of overdue and stolen books is waiting on development of an economical transaction device which can be installed at the 67 library branches.

CW Photos by M. Smalheiser

The Data Service Bureau uses 24 tape drives.

Porter said the city is currently using microfiche on a service bureau basis for library, personnel and police work and would like to expand it to other departments. If the expansion takes place, "we'll probably have our own hardware because we're at the break-even point now," he added.

In the city's financial department, daily information is available to the city controller on two CRTs from a financial file of every city account and fund. It is updated every night and ready for interrogation at 7 a.m.

Another project in the works calls for installation of remote terminals at outlying city administrative offices so they can access the centralized data banks.

This will be accomplished with two types of data communications networks – one for administrative and financial uses and the other for public safety functions.

As envisioned, the plan will use satellite computers or front-end computers and minis. Small satellites may be dedicated to certain functions but will be interfaced with large general-purpose machines.

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Calif. Checkless Society Checked

By Marvin Smalheiser
CW Correspondent

LOS ANGELES – The effort in California to initiate the cashless, checkless society has met with a temporary problem: insufficient business.

The Automatic Payments and Deposits System, a statewide, computerized plan for handling payrolls and billpaying, has plenty of funds to operate but has attracted few "customers" since it started looking for them in mid-October.

The system is designed to eliminate payroll checks and route authorized deposits and payments through automated clearinghouses in Los Angeles and San Francisco.

Bank customers can also authorize payment of certain monthly bills, like mortgages and utility bills, under the system.

Although 90% of the over 1,000 banking offices in California have signed up, the system has only four twice-monthly payrolls, one once-a-week payroll and a file of monthly mortgage payments.

Bank officials who helped set up the system are not dismayed, however, and said they expected a slow start-up, particularly because of the paperwork.

"The paperwork is killing us," said Gene Thurman, vice-president of the City National Bank, Beverly Hills, and vice-president of the California Automated Clearinghouse.

Thurman said a major achievement has been getting the first debits on the system.

Beginning last month automatic deductions from bank accounts for mortgage payments started. The system began with about 200 but is expected to have 800.

Thurman said no bank has had automatic debits for mortgage payments before.

Lack of User Enthusiasm Blamed For Lag in Automated Pay Systems

By a CW Staff Writer

ATLANTA, Ga. – Little customer demand and lack of enthusiasm – not technology – have been the major factors retarding the acceptance of electronic or computerized payment systems in banks, according to Federal Reserve Board member George W. Mitchell.

Speaking at a symposium on "The Development of an Electronic Funds Transfer System" here recently, Mitchell said: "While there have been ups and downs in adapting technology to money transfer, such setbacks have not been the major barrier to greater progress.

"Customer enthusiasm for electronic payment has been lacking. Convenicnce, the major advantage to individuals, has generated little spontaneous enthusiasm thus far," he said.

But, he added, some of this lack of enthusiasm might be the fault of the banking industry and other supporters of the computerized transfer of funds that will bc extremely important if the nation is to move closer to the goal of a "cashless, checkless" society.

"Financial benefits" possible with such systems "to individuals have not been offered and probably depend on competitive pressures," he stated.

Heat's On

At the same time, Mitchell said pressure might be mounting for banks to offer better and newer services to their customers to get them used to the automatic transfer of funds.

For example, he noted that savings and loan institutions were showing a great deal of interest in using such systems in new ways and offering new services. He noted, as an example, a Massachusetts experiment where several institutions are offering customers interest on accounts that can be used much like checking accounts.

But other factors are also holding back the acceptance of the computerized transfer of funds, he indicated.

"To some degree acceptance is held back by custom – money mores change slowly," he noted.

"Also, many individuals do not identify with the ephemeral character of an electronic 'byte,' and would prefer 'real' money or evidence thereof – coin, currency, or even a bank statement," he said.

Hospital Bill Letter Humanizes Machine —With Side Benefit

CHARLESTON, W. Va. – Persons with past due bills to the Charleston General Hospital receive the following personal letter from the hospital's computer suggesting payment of bills before the human staff finds out:

"Hello, there, I am the hospital's computer. As yet no one but me knows that you have not been making regular payments on this account. However, if I have not processed a payment from you within 10 days I will tell a human who will resort to other means of collection . . . "

Big Brother Is Watching

While he admits the letter may cause some feeling of "big brotherism," Herb Johnson, vice-president for finance, said "therc is no easy way to tell people they owe you money.

"We are hoping that by using a humorous approach people will not get mad and will take advantage of the 10-day grace period to get their account in order," he said.

In some cases this approach may be working too well as the computer is now in contact with a typewriter trying to unravel one account.

The typewriter's initial correspondence states:

"Dear Mr. or Ms. Computer: I am a typewriter at the office of M and M. Recently our mailbox received your notice in regard to a balance owed your masters by my master's client. The Xerox machine and I are sincerely grateful for your not informing those awful humans as to this bill, and if they punch your buttons the way they punch mine, I can see why you tend to be a little hesitant to do their bidding.

"I am told by my humans that their client is now in the process of suing some other human for the injuries he received and I will forward the billing to the particular humans for your remittance.

Sincerely, Royal Typewriter

P.S. – Our telephone would like your number for purposes of computer dating."

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We'd like to hear from you, even if it's only to congratulate Mrs. Johnson.

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Huntley, Illinois 60142

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Editorials

An End to Secrecy

The secrecy surrounding many of the documents in the various antitrust suits against IBM must be ended both for the good of the computer user, the computer industry and the general public.

The latest instance of what seems to be part of an ongoing effort to keep knowledge of the cases from public view occurred when IBM blocked the release of 25 documents requested by the Computer Industry Association – documents that had been filed as part of the Telex-IBM case and which therefore should have been entered in the public record.

IBM claims the documents contained trade secret information that would be harmful to it if released publicly. But the CIA has charged the information in the documents concerns only marketing projections indicating how IBM viewed the effects of some price and configuration changes.

If the CIA view is correct, then the documents could show users – in IBM's own words – how IBM juggled prices in order to keep competition down while still extracting the maximum profit from user expenditures.

The information could reveal the extent to which IBM tries to maintain price control in the computer marketplace and how the firm makes configuration decisions based solely on maximizing profits.

But that information is not available.

It is time for IBM to start following the protestations often made by its lawyers in court that it wants all of the facts of the cases out in the open for public scrutiny.

If this is really so, why not open up all of the documents in the case for public scrutiny? If IBM really has nothing to hide, if its hands are as clean as it proclaims, then it will release all of the documents in the case.

Back to the Original Plan

Originally the joint DPMA/ACM plan for a Computer Foundation was an attractive one. It was approved by both societies' executive boards. It was approved by the DPMA Certification Council and it attracted the support of a broad base of organizations and individuals in the industry.

In fact, the plan, as laid down by the special Certification and Testing Advisory Committee, demonstrated that a broad-based certification program would be acceptable – just as it said it would.

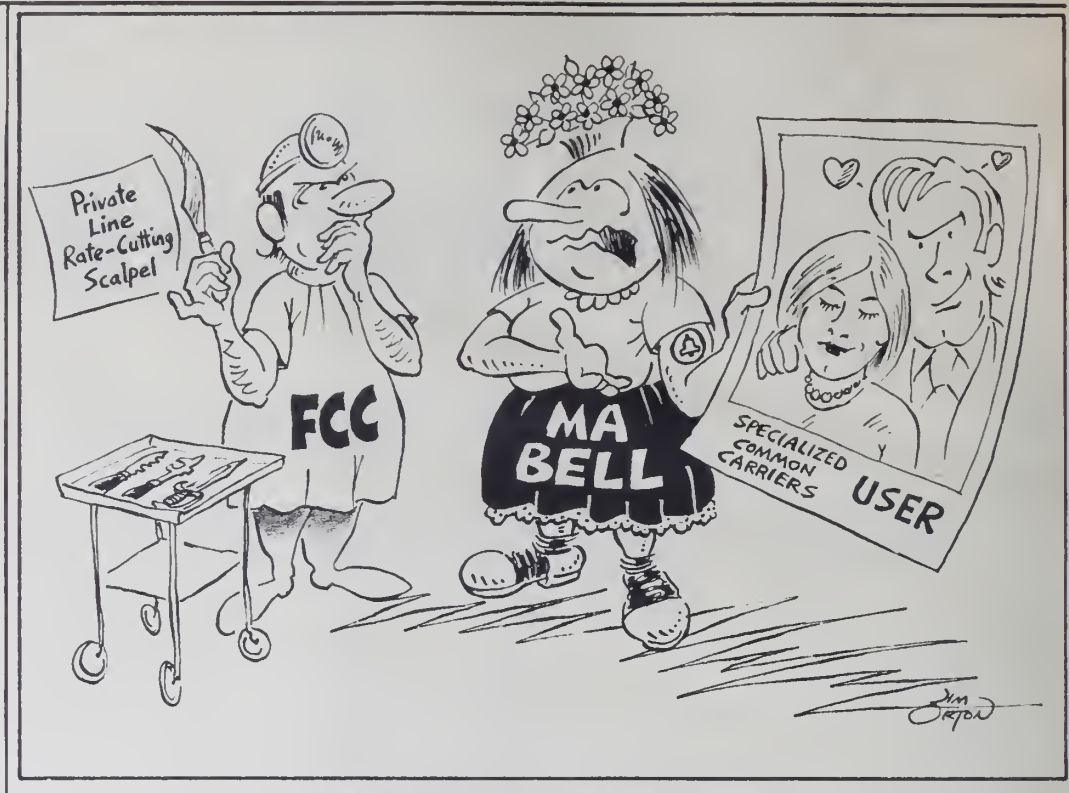
Currently, however, the original plan is not being implemented. The draft constitution and bylaws created by DPMA's and ACM's representatives in many ways are a travesty of the plan.

For instance, instead of joint, equal control they substituted a meaningless, powerless expensive board of directors – with effective control vested in an executive director and the president.

Moreover, the actions since the draft consititution was unveiled effectively destroyed the idea that the ACM and DPMA representatives were interested in implementing the original plan.

There are problems. But, there is also an opportunity. No one has attacked the original plan. So why not stop arguing about what plan to adopt, and simply work at implementing the plan that has everyone's approval?

Computerworld believes this is the most constructive path possible under the circumstances. The profession deserves the chance that the original plan gave it, and will not look kindly upon anyone who denies it this opportunity.



'A Facelift, Doc – on the Double!'

Letters to the Editor

Beware RPG II Perils – Nothing Hard Is Easy

I have been reading the recent odes to RPG II with a mixture of amusement, horror and awe for those more gifted than I who have been able to make the language work for them on a cost-effective basis.

I have seven years of experience in the field, with a long hitch of reentrant 360 BAL for communications. A year ago, I took a job here in New Mexico as the manager of a service bureau for the rural electric co-ops. The board had already ordered a System/3 Model 10 with a full "Rural Electric Accounting" FDP (price, $3,000). This work was written in RPG II.

After a full year's work by three seasoned programmers, the package has been debugged and runs in a reasonable amount of time. When first implemented, a manual system would have run rings around it.

With the above as an introduction, I would like to make a few remarks on this "language of the future." There was one key sentence in the viewpoint article which stated that a detailed knowledge of the RPG cycle was necessary to attain any of the benefits described [CW, Feb. 27]. I would concur with all my heart. But where does one get this detailed knowledge of the cycle?

Alas, not from IBM. Not from its courses or manuals. Not even, it seems, from its PLMs.

My staff has acquired some of this wisdom over the year from solving specific problems and assiduous study, but we have yet to find one source (even a tailor-made course at $23/hr) that would get us to the point of being able to debug a simple matching-records application in an acceptable amount of time.

My warning to the potential RPG user is: Nothing difficult is easy – *Computerworld* headlines about learning programming in half an hour and reducing inventory by $500,000 notwithstanding.

RPG II is a sophisticated language in that it embodies generalized logic for normal DP events. That logic is often more generalized and clever than one would guess, and will cause havoc once the novice ventures away from his 30-minute print specials. Some of these RPG encomia sound like they were written in Armonk.

R.D. Mallery
Manager
Cooperative Services, Inc.
Sante Fe, New Mexico

How Much Should Newspaper Educate?

I wish to take issue with the policy of *Computerworld*. The newspaper is not written "for the computer community." Within the pages each week CW talks about today in the field and in the profession. Each week comments are made on the changes that new equipment and new knowledge are causing.

How do humans change? Only by education.

I feel that CW is the major means of communication in the data processing profession, and has an obligation and a responsibility to assist in the education of the profession by providing continuing items that would teach languages, systems, principles of operations, etc.

CW seems to feel we all know all we need to know. This is far from true. Most of us are interested in learning more and don't have time to read a book, or go back to school. Why not have short items in the paper written to teach us about a subject, not just inform?

We all want the people we hire to be better trained. The educational institutions are trying but not hard enough, and the manufacturers are just starting to try. Why can't CW try also?

Education is the only true path to professional improvement. If CW is to be of service, it must change its policy and help in problems of education, or, if you wish, the problem of updating the community.

R.E. Sennet, C.D.E.
Bartlett, Ill.

By definition a newspaper is "(1) a paper that is printed and distributed usually daily or weekly and contains news, articles of opinion, features, and advertising" – Webster's Seventh New Collegiate Dictionary.

Computerworld's editors believe our main purpose is to keep our readers up to date on current events in the DP community. We hope many of our interview or informative-type stories will also serve to educate readers by illustrating the experiences of other users. Many of our feature-type stories – such as the articles on disk recording and testing in the Systems & Peripherals sections of the March 7 and 14 issues – do fit a straight education need. Ed.

Markup Rates Missing

Again Alan Taylor's distaste for IBM is quite evident ["IBM Maintenance Markup Revealed," CW, Feb. 14]. I am not an IBMer nor even an ex-IBMer, as a matter of fact, I do not like their methods but I will not attack them with half truths.

There is one item missing from the charts and is very possibly only known to IBM, which is overhead rate. Without this knowledge the 300% and 440% markups become very unreal. With the support system IBM has, I would venture to guess its overhead is in excess of 150%.

The Time Service Contract chart shows there are 36 hours of indirect labor (140 productive hours vs. 176 available hours). Or does Taylor suggest the engineer doesn't get paid for these 36 hours?

Travel time was considered in the Time Service Contract but not in the Maintenance Service Contract. Does one assume that with a Maintenance Service Contract the engineer does not have to travel?

I know that with the term "gross markup" the overhead is being considered, but this is not evident in the chart or the article.

In the two above-mentioned areas, Taylor would find other concerns such as CDC, Honeywell, Xerox, Burroughs and Digital Equipment with quite comparable "gross markups."

Charles A. Cline
Burlington, Mass.

Specific Areas of Interest

Four Journals Hope to Stimulate Cobol Development

Six months ago the readers of this column responded to an open survey, saying they wanted to know a lot more about Cobol and how it was governed. They wanted to insure that their interests were being watched during the development of the language; they wanted to know why a language which was supposed to be hardware independent was turning out not to be transferable from one machine to another; they wanted to know how whole areas like the Report Writer could be threatened without involving the community. In general, they had a lot of questions.

The Taylor Report
By
Alan Taylor, CDP

Since then I have been trying to get the answers. Perhaps the most enlightening moment came when the Cobol Coordinating Committee sat down for a couple of hours with Robert Kearney, chairman of Ansi Committee X3J4, the operation which puts a stamp of approval on the Cobol standard, as produced by the Programming Languages Committee (PLC). PLC is one of the five autonomous committees of the Conference on Data Systems Languages (Codasyl).

In our meeting with Kearney, we asked many questions. But the key answer that came out of that meeting was that answers are not available from Ansi X3J4.

Questions Not Avoided

It was not that Kearney was avoiding our questions. One of the major functions of the American National Standards Institute is to see that the public does get answers.

But Kearney gave the committee the Ansi answers. On the point of transferability, for instance, he said it was not directly relevant to the question of the Cobol standard. The Cobol standard just deals with interpreting the language.

On the point of compile time, or object time, and error messages, he pointed out that these also were not relevant to the standard. Indeed, we found the great majority of questions were simply not being answered – if answering means more than saying "not relevant."

We also discovered that this situation was not just a recent development. Even back in 1968, when questions such as ours came in, they were put off for later consideration. Kearney admitted he did not believe these had ever been further considered by his committee or its predecessors. He felt if they had not been picked up by one of the sponsors in Codasyl, and put into the appropriate form, then nothing would have happened.

Facts Hard to Find

At the same time, I found it extremely difficult to determine how matters concerning Cobol were proceeding. The current vice-chairman of PLC told me the process of getting a proposal accepted by PLC was akin to getting a case accepted by the Supreme Court. He was not exaggerating.

I found the operations of the executive council of Codasyl equally mysterious. In desperation I traveled from Washington to Atlanta with Jack Jones, chairman of the executive committee. I spent several hours with him but he himself was unable to find the minutes of the recent Executive Council Committee meeting. (Later he did send a couple of copies to me.)

A visit to the PLC archives produced similar results. The archives are kept in a single four-drawer filing cabinet in Washington, held by William Rinehuls of the U.S. Air Force. They were not complete and it appears much of the material is being kept secret.

To find answers in this area an ordinary Cobol practitioner would have to have the patience of Job, and the investigation capabilities of Sherlock Holmes.

Something clearly had to be done. The question was what.

False Starts

We made a few false starts. First we took much of the old documentation going back to 1962 and microfilmed it. This was sent out to centers across the country, but so far has not had effective results.

The fault may well be ours because of a lack of administrative capability to coordinate the operation. However, it showed that centers were available, that documents could be made available, and it gave us an idea of what the costs would be. (They were high.)

This experiment also showed, however, that merely having the documents did not fulfill our needs. Moreover, when we later tried taking a question and answering it by discussing the whole Cobol situation and suggesting where possibly useful documents might be, the readers' eyes began to glaze.

Situation Too Complex

Again this was not surprising. The Cobol situation is anything but a simple one. It soon became clear that most practicing programmers would rather let things go on as they are, or simply abandon Cobol altogether, rather than try to fight their way through the thickets of Ansi, Codasyl, X3J4, etc.

In addition, in talking to some of the people who are expert in one or more Cobol areas, we found them unwilling to consider the type of questions the Cobol programmers were asking. The experts were concentrating on specific areas and they wanted us to concentrate there also.

They finally concluded that there were at least two different audiences to be addressed, and both audiences got turned off if we gave them too much of the material appropriate to the other.

Segmented Information

This was the clue we needed. It seemed not so much a question of providing full information, as of providing relevant information. It seems we must segment information into specific interest areas. The answer then seems to be to develop ways of answering questions publicly, but in the context of particular interests.

So the Cobol Coordinating Committee is introducing a series of periodicals to keep up with users' interests in Cobol. To start with we are publishing the *3Cs Question and Answer Journal.*

Questions that come in are answered at length – generally one or two pages each – and are not discussed simply within the confines of a particular standard. Instead the answers deal with the situation as it exists.

They take into account the problems of maintaining the Cobol advantages – all of them – and the lack of resources available in Codasyl. And they deal with questions like "Why shouldn't Cobol be stopped now?", as well as others. What the *Question and Answer Journal* doesn't do is expect the questioner to start attending PLC meetings, or become a protocol expert.

The *Question and Answer Journal* started in January, and is now coming out monthly. But the *Question and Answer Journal* does not handle everything. It does not, for instance, handle the specific proposals that are made either by the readers or by the Cobol Coordinating Committee itself. These proposals are considered in a different journal – the *3Cs Proposal Journal* which began last month.

In the case of the proposals made to the Cobol Coordinating Committee, the journal includes a review and recommendation to the committee for action. The review is done by the 3C Research Department which calls on whatever knowledge is available.

The reviews are sent back to the person who submits the proposal for his comments before the coordinating committee itself takes action, so that the proposals can be handled as quickly as possible at a later date.

Technical Considerations

A third area of sufficient importance to merit a separate journal deals with technical considerations. For instance, we have received considerable details on a decision-table compiler insert into Cobol from Norway.

Other technical considerations came from the Cobol Compiler Symposium that Codasyl sponsored last year. These include the details and problems involved in the debugging area, etc.

It is not known how many of these technical developments there actually are. They should be fairly specialized detailed suggestions which could later be worked up into proposals. The first issue of the *Technical Journal* will come out this month.

Then the Rag-Bag

The fourth (and last) of the 3C journals is a bit of a rag-bag. It is somewhat similar to the Share secretary's distribution that many readers are familiar with, and the last pages in the Codasyl PLC publications.

The journal simply consists of statements made by various people which are of reasonable interest to the community, with additional background statements.

It includes, for instance, the statement by the chairman of the Programming Languages Committee, that PLC, for financial reasons, can only supply a single copy of its mimeographed minutes. It includes the formal IBM claim that Ansi has delegated authority over Cobol to PLC.

It includes the statements of ACM President Anthony Ralston, that ACM as a matter of policy, will not pay royalties on the printing of Cobol documents, even where it is making a substantial profit from it.

All these items shed a certain amount of light on the background of Codasyl, and we think some people may be interested in them. And so the fourth and last journal is the *3Cs Correspondence Journal.*

Year's Trial

The present plan is to run these four journals for about a year, producing them and distributing them to anyone who wants them. The members of the Cobol Coordinating Committee will act on ideas in the appropriate areas.

Between them they hold membership on most of the relevant industry groups, including Ansi, Ansi Committee X3, Codasyl, etc. If worthwhile proposals should appear that should be incorporated into the language we will certainly deal with them. Frankly, that is one of the main functions of the committee.

Now the matter is up to you. If you are interested in the development of Cobol and in safeguarding the interests of current Cobol users, please consider subscribing to one or more of the journals with the order forms above.

We would also like your opinions on whether each journal is a worthwhile operation before beginning the second year of publication.

So far, this seems to be the best way in which we can assist the Cobol operation and the Cobol user. It certainly is a new way. So let's give it a try.

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Subscription Form for 3Cs Journals

To: The 3Cs Research Department
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After completion please return to Alan Taylor, Taylor Reports, Computerworld, 797 Washington St., Newton, Mass. 02160.

Letters to the Editor

Degree or Experience Needed For Membership in ACM

In the Feb. 14 issue, Alan Taylor listed the professional groups which support the Computer Foundation. In the table, the requirements for membership in the Association for Computing Machinery (ACM) were shown incorrectly.

Any person who subscribes to the purposes of ACM may join as an associate member. A person who has either a bachelors degree *or* the academic equivalent *or* four years' full-time experience in information processing may join as a full member.

The annual dues are $35 for both and the only difference is that associate members do not vote in elections or on other ACM matters. There is also a student membership available to full-time students at $8 dues.

In addition, while there are no mandatory local dues, there are over 200 regular and student chapters which charge nominal dues. There are also subunits of ACM organized along specialized technical lines which issue their own publications and generally charge nominal dues.

Jean E. Sammet
ACM Vice-President
New York, N.Y.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

(Other letters on Page 12.)

Hammering Home a Point

Why Don't Salesmen Talk of the Application?

By Jerrold Asher
Special to Computerworld

My 88 cent bargain hammer broke. I set out to buy a quality hammer – one like the professionals use. My local builder's supply company had a dozen different models which I narrowed down to two: one for $2.39 and another for $7.89. Both were the same size, looked equivalent, and had about the same heft and balance, yet the price tags were quite different.

So I approached the department manager, an elderly gentleman who looked like he really knew his onions – uh, hardware – showed him the two hammers and asked the difference.

"This one is made in Japan. (So are some of the finest cameras, almost all our transistor radios, at least 50% of our hand calculators, some excellent compact automobiles . . .)

"The other hammer is made by Old Time Hardware. It's guaranteed."

"For how long?" I asked, in my caveat emptorial tone.

"It's guaranteed. If it ever breaks, Old Time will replace it."

"Forever? Where is the guarantee?"

"Read the guarantee on that label on the handle."

The "guarantee" on the handle was an admonition to wear safety glasses when using the hammer.

"That's not a guarantee; it's a safety warning."

"Well, the other hammer is made in Japan. Everyone knows Old Time tools are the best."

Further conversation was obviously pointless. I deposited both on the counter and left – hammerless.

Before you conclude hardware salesmen are a totally different lot, consider this: our current breed of business machine salesmen is little better equipped to sell complex data processing equipment than the gentleman described above.

Business machine salesmen speak with great authority of the mechanical features of their various equipment but with a shameless lack of knowledge of how these

Viewpoint

features would be applied to the prospect's business.

The sales contest becomes a numbers game: this disk is bigger than that disk; or our magnetic stripe contains more characters than their magnetic stripe. We have a core memory inside our terminals, and the cheaper ones do not.

Is it asking too much to expect the salesman of $10,000 plus equipment to show how the machine will process the data in the client's business more effectively? What became of the "buyer benefits" on which we used to be drilled in sales manuals and sales training lectures?

The client is not an engineer. How can he tell which of three different disk sizes or cassette tapes will be useful in his application?

Maybe business machines are so simple or good salesmen are so hard to find that the major manufacturers don't bother teaching how to apply the equipment to the application.

Perhaps it's simply assumed that data processing is so well understood, that hearing the capabilities of any equipment is enough to appreciate its usefulness. I would like to relax and take refuge in that oversimplification. Unfortunately, I find the purveyors of even more complex terminal equipment suffer the same malady.

Our company regularly purchases CRT terminals of which there are at least six excellent manufacturers. Yet each of the salesmen of our potential sources only speaks glowingly of the technical features of his device.

When we define our applications to these men and request definitions as to why their particular unit is best suited, we get more specification speeches and unique feature facts. This is also true of line printers and cartridge disk storage units. We know some applications are just not suited for some peripheral devices.

Are we expecting too much of the business machine and computer peripherals salesmen? Shouldn't these well-paid men be capable of *applying* the unique features of their equipment to specific problems? Isn't that what salesmanship is? We think so.

Won't someone please sell me a hammer?

Jerrold Asher is marketing manager for Sierra Data Systems, Inc., Pasadena, Calif.

Letters to the Editor

CDP Exam Not a Standard With 17 Questions on Cobol

After taking the CDP exam last month, I must say I was very disappointed with the software and programming section. Out of 60 questions in this section, 17 questions were directly related to Cobol.

I have read numerous articles regarding the CDP exam which make statements to the effect that this exam is aimed at the industry in general and should be established as a standard for the industry.

It is beyond reason that a "standard" for the industry should emphasize so heavily one computer language used by one segment of the industry. There were no other direct questions regarding any other procedure-oriented language in the software section or any other section of the exam.

If the DPMA cannot develop 60 basic software questions without reference to a procedure-oriented language, I would be most happy to supply them with questions that are basic to computer programming regardless of the language used.

If the intent of the DPMA is to make the CDP exam a standard, then direct references to tools used by only a segment of the industry must be removed. If the intent is to orient the exam toward one segment of the industry then this should be stated and the exam has met its due fate.

Douglas M. King
Houston, Texas

AEDS Support Was There!

I enjoyed the Alan Taylor column in the Feb. 14 issue. I am sorry, however, that his ears were not quite as sharp as they should have been at the initial meeting to discuss the organization of the Computer Foundation.

I am referring in particular to the boxed column in which he listed the professional societies which have expressed support for the Computer Foundation. He did not mention the Association for Educational Data Systems which was represented at that meeting by myself and Paul Pair.

AEDS currently has about 1,200 members and has been in existence since 1962. I should also mention that our annual convention will be held April 16-19 at the Marriott Hotel in New Orleans. Our dues are $20, and our headquarters are at 1201 Sixteenth St. N.W., Washington, D.C. 20036.

Bruce K. Alcorn
President-Elect
AEDS
Washington, D.C.

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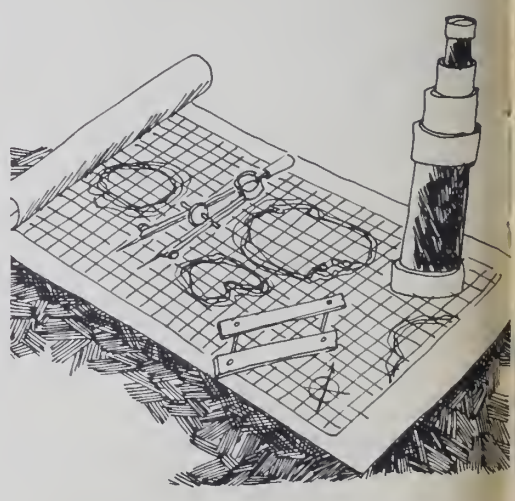

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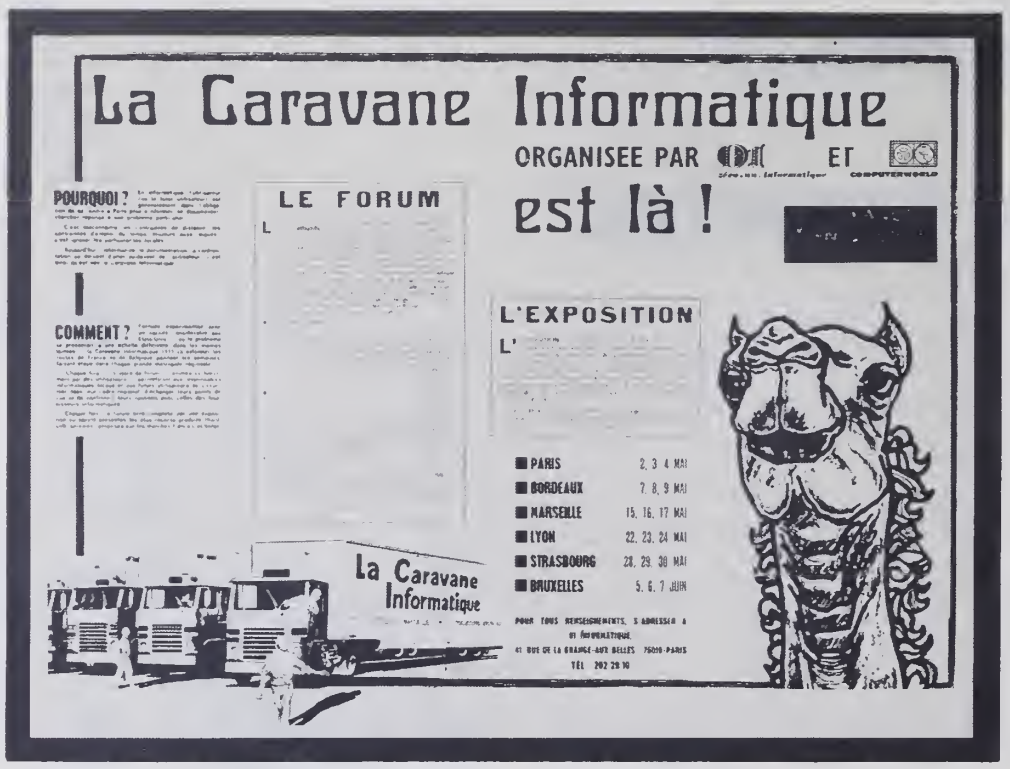

Computerworld's French market Computer Caravan is a French show. Because it's being co-sponsored by the leading French Computer publications, Zero-*Un Informatique*. With the leadership of Zero-Un's widely respected monthly magazine and weekly newspaper, French market computer users will know they're getting an Exposition that is uniquely theirs. We'll be conducting The Caravan in local hotels, and orienting the user Forums to accommodate the needs of French market users.

This combination of French control, French publicity and user-orientation will draw thousands of important EDP buying influences as we travel to six cities in 2 countries. And these people are part of one of the most rapidly growing computer markets in the world. Here are some of the figures, according to a recent survey by International Data Corporation:

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Projected increase for 1972	8.1%	(1.6 billion)
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May 7-9	Bordeaux	Palais Des Expositions
May 15-17	Marseille	Palais Des Congres
May 22-24	Lyon	Palais Des Congres
May 28-30	Strasbourg	Palais Des Expositions
June 5-7	Brussels	Palais Rogier

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- ☐ French Market Caravan (May 2-June 7)
- ☐ English Market Caravan (Sept. 4-Oct. 18, 7 cities)
- ☐ German Market Caravan (Oct. 30-Nov. 30, 5 cities)

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SOFTWARE & SERVICES

Random Notes

Government Users Group Plans California Meeting

MONTEREY, Calif. – Open to DP staffs at all levels of government, the Computer Performance Evaluation Users Group (CPEUG) is holding its spring meeting next week at the Naval Postgraduate School here to encourage attendance by people from west coast facilities, according to CPEUG chairman John A. Blue of the Navy's ADP Equipment Selection Office.

Pre-registration is not required, Blue noted, and the meeting starts Tuesday, March 20, and will run through noon on Friday, March 23.

PDP-11 Users Gain New 'Bias' Cross-Assembler, and . . .

TARZANA, Calif. – A cross-assembler that can utilize various large-scale CPUs – including IBM 360/370, Burroughs B6700, or Univac 1100 – to produce object programs for DEC PDP-11/20 or 11/45 minicomputers, is now available from Compata Inc.

Written in Fortran, the package can be delivered in one week for $1,500. Given four to six weeks, Compata said it can adapt Bias to produce object code for other target machines, for an average cost of $7,000 to $10,000. Compata is at 18345 Ventura Blvd., 91356.

. . . 'Mimic' Device Simulation

WALTHAM, Mass. – Device simulation for DEC PDP-11 users, a new assembler for Data General Nova users and improved debugging facilities for most of the popular minis are among the enhancements in the Mimic system of programming aids available on the First Data Corp. time-sharing service.

Assembly, loading and testing support for GRI-909 and -99 minis has also been added to the Mimic system originally developed by Applied Data Research. In addition to those aids, a machine language assembler is available for the Honeywell H316/516 family of minis, First Data noted from 400 Totten Pond Road, 02154.

Univac Adapts 'Ices' for 1100s

BLUE BELL, Pa. – The Integrated Civil Engineering System (Ices) and two subsystems – Structural Design Language (Strudl II) and a file storage facility (Table 1) – will be available for Univac 1100 users operating in batch, remote batch or time-sharing mode under Exec 8, within the next two months.

The new software from Univac will include a problem oriented language (POL) allowing the user to state his input in familiar terms, and an engineering programming language (Icetran) to support dynamic array capabilities in the subroutines that actually perform the engineering operations.

Ex-ACM Head Claims

'Extensibles' Resolve Language Gaps

By Don Leavitt
Of the CW Staff

COLUMBUS, Ohio – Users should badger their vendors to provide extensible languages, Prof. Bernard A. Galler of the University of Michigan told the recent Computer Science Conference here, and there are very few reasons why the vendors shouldn't be willing to accommodate the users in this area, just as they are now making microprogramming more readily available.

Extensible languages (ELs) allow a user to define new functions as he needs them, without necessarily affecting the basic compiler. With this capability, programmers can express logic appropriate to the application, rather than express logic appropriate to an otherwise arbitrary language, the former president of the Association for Computing Machinery (ACM) noted.

"It's always greener in someone else's language," he mused, adding that the definition facility is useful to both novice and professional programmer. The latter is able to make small personal changes in the language so it is more comfortable for him; the other can build library "packages" of extensions to ease the work required by the average programmer.

Defining extensions is "something any intelligent programmer can do," Galler said, but noted he wasn't advocating a mass confusion of many personalized language processors. The best EL should be rich enough so that most users would never have to extend it, "as long as they have the possibility if they need it."

In effect, he added, ELs allow available languages to grow "in a graceful way" without some committee meeting somewhere to hammer out a revised standard.

Though ELs have limitations on how far they can be extended, they shouldn't be confused, he cautioned, with Cobol shorthands and other abbreviation schemes which don't actually change a language, or with "compiler-compilers" which change a language for all users – not just the one redefining the function.

The personal convenience of working with a language that does what the user really wants it to do can be translated directly into greater productivity, he said, and that should be reason enough for any DP manager to advocate the use of ELs.

Beyond that, however, programs written under ELs have been found to be easier for maintenance programmers to read, since they are problem- rather than DP procedure-oriented, Galler added.

Optimize Program

At a deeper level, Galler noted that the object code changes made possible through ELs can be used to optimize the program itself, in terms of accuracy or efficiency, or to monitor the performance of the program without requiring a special monitoring package.

ELs have been around since the days of MAD on the 7090 in the early 1960s, he noted, but the developers have matured sharply in the past few years. Not long ago, he said, each was interested in his own "beautiful little language." Now they are struggling with defining the real problems of language design and the harder problems of control structures.

In any case, ELs are better accepted than they were and they can be extremely effective tools. Vendors are still wary of problems they may encounter trying to maintain ELs at user sites, Galler said, but they should also see ELs as a way toward simpler standard languages that the user can customize on his own.

Accounting Standards Enforced Through 'Editor' JCL Checking

LYONS, Ill. – DOS/360 installation managers can enforce their system accounting standards as jobs are presented to the system for execution, through the Job Control Statement Editor program from General Electronics.

The Editor works in conjunction with the Job Accounting (JA) interface provided by DOS Release 25 and later releases, but is tailored to user-specified needs which may extend beyond the information saved or used by the JA interface. In effect, the Editor prevents nonstandard jobs from entering the job stream and ultimately the job accounting system.

The Editor checks every Job and Exec card for information defined as required by the user's standards. Parameters beyond those normally needed by JCL could be used, General Electronics suggested, to identify the processing cycle for each job, or its status in terms of test, production or rerun.

Explains Reruns

Reruns may include an additional code explaining why the job had to be done over. In any case, if the cards do not meet the standards, the Editor will, at a user option, issue a warning message, cancel the job or both.

The package requires no change in the IBM-supplied operating system or in the JA interface coding, the company said, and the use of the Editor can be stopped whenever the user is satisfied that the JCL cards are both accurate and set up according to the desired standards.

General Electronics handles the initial tailoring of the Editor to the user's specifications. This forces the user to define his standards before he orders the package and it insures that the program is tailored properly, at least the first time, the firm noted.

Once tailored, the package is delivered in object form. If the trial use is satisfactory, the user pays a one-time charge of $200 and the vendor sends the source code so the user can make any further modifications he wishes.

The company can be reached through P.O. Box 79, 60534.

'Pacer' Allows CICS Adjustment

HACKENSACK, N.J. – The Program Activity Configurator (Pacer) module from On-Line Software Inc. permits IBM CICS system adjustments to be made on a demand basis without taking the system or the programs off-line.

Pacer allows either OS or DOS users to reroute transactions to a substitute program when an executing program develops problems. It permits on-line modification of program control parameters, including both task priority and task security.

In operation this means several versions of a CICS application can be carried on the system concurrently, for testing or backup. Processing can be shifted back to a proven version of a program, for example, if a test or attempted production use of a revised version fails.

Pacer is accessed through a conventional CICS terminal entry, On-Line said. Rerouting is done by entering the name of the program that is to process the transactions, and the transaction code for each input being shifted.

Program characteristics can be altered by supplying the new security level of the module and the desired dispatching priority of the defined task. Pacer responds by typing out verifying information.

The response also lists other actions triggered by the request, but not specifically cited in the request. When transactions are rerouted, for example, the old program is shown as deleted. Both old and new conditions are listed when priority or security changes are made.

Pacer can be installed in any DOS/CICS version 1.0 or 1.1, or OS/CICS version 2.0 or 2.2 configuration. The package is available for $500 from 411 Hackensack Ave., 07601.

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Two Firms Install 'Public' Remote Batch Facilities

By Don Leavitt
Of the CW Staff

"Public" terminal facilities run by third parties allow qualified users to have high-speed I/O linkage to a choice of remote-computing networks, and may ultimately provide an alternative to users maintaining their own in-house DP installations.

Some network vendors have already seen the need to supplement the slow speed and limited output capabilities of terminals often found at user sites. They have set up remote batch stations in major cities to which users can direct output too bulky for their own interactive terminals.

Now, two separate independent companies – Advanced Terminal Applications (ATA), New York, and RJE Data Processing Inc., Chicago – have installed their own remote batch equipment and made it available to users with valid user numbers for remote-computing networks.

Since users from several networks will be underwriting the cost of the one remote station, the costs of the extended support should be less than if the station were limited to users from a single network. That, at least, is the concept.

Both ATA and RJE Data Processing are basing their services on Mohawk Data Sciences Model 2400 intelligent terminals, but the companies clearly differ in the amount of service they feel the user wants or needs.

ATA sees its primary role as a receiving point for long print runs and punched card output from application programs initiated at the user's own terminal. If the user wishes, ATA even arranges delivery of the output after it has been received on the MDS 2400.

User Work Space

By contrast, the Chicago office of RJE Data Processing includes work space so that users can run jobs and develop programs directly on or through the Mohawk equipment. Subscribers are provided offices specifically for their use, but even the more casual non-subscribing user will have desk space, the company said.

Each of the Mohawk systems can be used as a stand-alone CPU for simple jobs, in addition to serving as a terminal to a remote-computing network. ATA's configuration is large enough to handle a five-tape sort; RJE Data Processing's includes both a 7-channel and a 9-channel tape drive.

Users pay the remote-computing networks directly for any resources they access through the new centers, and pay ATA or RJE Data Processing separately for the use of their facilities. ATA has an initiation fee of $50 and an as-used charge of $24/terminal hour, subject to a $10 "per session" minimum.

Ata is at 437 Madison Ave., New York, N.Y. 10022.

RJE Data Processing subscribers pay $100/mo plus an average of $3 or $4/job, depending on the amount and type of output generated. This firm is located at 4738 W. Peterson Ave., Chicago, Ill. 60646.

'Relo-Plus' Supports 360/370 DOS

DANBURY, Conn. – Maintenance of a core image library of self-relocatable programs for DOS 360/370 users is easier and less core consuming with Relo-Plus than with earlier packages that performed the same basic function, according to the developer, Universal Software Inc.

As with all self-relocation packages, Relo-Plus allows the user to catalog one copy of an application program for execution in any partition that is available. Under standard DOS, the user has to catalog and maintain a copy of the program for each partition in which it might run.

Relocation with the Universal support is provided through the addition of a single control card when the user's program is being cataloged.

Relo-Plus supports either single or multiphased programs and provides an improved fetching method, to get the programs into core faster. The new approach is said to reduce the number of directory seeks and to allow the reading of multiple program blocks in a single disk revolution.

Universal sees self-relocation as a useful facility in its own right, but also as a complementary enhancement to the spooling of slow-speed I/O provided by Universal's Asap. Therefore the company offers Relo-Plus as a stand-alone package for $2,000 or $150/mo, or as an extra-cost option with DOS Asap for $950.

Universal Software is at Commerce Park, 06810.

In One Pass, Cars 2 Surveys Many Files, Produces 11 Reports

EAST ORANGE, N.J. – Users can generate as many as 11 reports from multiple files, with a single pass of the enhanced Cars 2 Audit Reporter package from Computer Audit Systems Inc.

Intended as an examination system for financial data files, the software permits three heading and two detail line formats per report with a free format to the heading and detail information for each. The system also supports flexible output editing, (which may be a report or a new magnetic tape), totaling of selected fields and user-controlled report sequencing.

The package can be used to extract information from a file or simply to survey the data contained in the file. Users may specify as many as 25 criteria per pass for either extraction or surveying, and internal control records can be bypassed as long as they can be recognized, a company spokesman said.

The Cars 2 Audit Reporter includes the previously available facility for the statistical sampling of records based on random selection.

While the package includes a broad range of possible audit routines, it is nonetheless efficient, the company explained, since only selected procedures are retained in the load-and-go programs created by the system. Since the parameters can be changed with each use, auditors are able to test files several ways in rapid succession, thereby assuring the integrity of the data, the spokesman noted.

Written in ANS Cobol, the new Cars 2 can be used on most third generation CPUs with at least 64K bytes of storage. The system costs $10,500 plus training and installation support. These costs may be modified somewhat in light of user experience with other audit retrieval systems, the company added.

Computer Audit Systems is at 725 Park Ave., 07107.

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COMMUNICATIONS

Data Briefs

Tektronix Questions Users On Plan for Graphics Group

BEAVERTON, Ore. – Tektronix Inc. is circulating a questionnaire to users of its graphics display terminals to determine the need for a user group.

The group would provide "a central point of exchange of information among users." The questionnaire asks users to list the equipment they are using together with their applications and programming languages now being utilized.

Information is available from Jon A. Meads, cochairman of the users' group committee, Box 500, 97005.

Singer Adds Stand-Alone Modem

SAN LEANDRO, Calif. – The Singer Co. has a stand-alone modem for its System Ten and 4310 data terminal. The 2024 modem operates over 2- and 4-wire dedicated or dial-up lines and is compatible with the Bell 201A and 201B data sets.

The Singer modem can transmit at switch-selectable rates ranging from 1,000 to 2,400 bit/sec. A front panel indicator displays carrier status, and the device includes local and remote loop-back features.

The modem costs $1,600 or $60/mo on a one-year lease. Delivery is 60 days from 2350 Washington Ave., 94577.

Telenet Plans Data System

WALTHAM, Mass. – Telenet Communications Corp., a subsidiary of Bolt, Beranek and Newman, Inc., is planning to operate a "multipurpose packet-switching network" for data communications users.

In a letter to the FCC, Telenet said it intends to file an application similar to that already filed by Packet Communications Inc., "as soon as supporting material is completed."

Telenet and BBN are developing packet-switching equipment to operate with satellites and higher-capacity digital facilities, the letter said. The firm is at 275 Wyman St., 02154.

Unit Tests Distortion

CHERRY HILL, N.J. – Computest Corp. has a portable distortion analyzer for testing synchronous and asynchronous data lines.

The Model DA-541 uses an LED display to record the percentage of distortion. In addition, the unit can determine the type and cause of distortion including bias, end, characteristic and speed.

The tester operates at 12 data speeds ranging from 45.5- to 4,800 bit/sec. The DA-541 operates from batteries or ac power and accepts 5- through 8-level start/stop codes. It is priced at $825 from the firm at Three Computer Drive, 08002.

Canada to Begin All-Digital Dataroute

OTTAWA, Canada – An end-to-end digital communications service called Dataroute will begin operations in 11 Canadian cities in April.

Providing full-duplex private-line serial transmissions in a broad range of synchronous and asynchronous speeds, the Dataroute service will be expressly designed to meet the needs of computer/communications users.

Described as the "first nationwide digital data system," the Dataroute service will provide cost savings up to 90% compared with present analog facilities, according to the Computer Communications Group of the Trans-Canada Telephone System (TCTS).

Dataroute service areas scheduled to begin operation on April 15 include Vancouver, Calgary, Regina, Winnipeg, Toronto, Ottawa, Montreal, Quebec City, Halifax, Moncton and St. John, N.B. By the end of the year the network will be expanded to 23 cities, a spokesman said.

For subscribers not directly in one of the initial service areas, dial-up access will be available. Included in the Dataroute service offerings are point-to-point private-line facilities operating from 110- to 50 kbit/sec; and multipoint private line from 110- to 19.2 kbit/sec.

The Dataroute service will be provided on an end-to-end turnkey basis including all interface equipment required up to the user's CPU and/or terminal interface.

The greatest cost savings will be realized by low-speed subscribers such as time-sharing users, according to TCTS. A 300 word/min circuit from Toronto to Vancouver now costs about $3,500/mo, but on the Dataroute the same facilities will cost only $350/mo. Savings in the medium-speed range are described as less dramatic but savings for high-speed transmission are also significant, according to TCTS.

The Dataroute rates will be less dependent on distance and more associated with transmission speed and the time of day than existing services. Separate rates will be available to cover the business day from 8 a.m. to 5 p.m.; for night-time service; and for 24-hour usage.

Much of the equipment being used for the Dataroute service is being provided by Computer Transmission Corp. and is also available to U.S. data users.

Two types of interface will be provided depending on the subscriber's data speed. The Directran will interface with sites operating at asynchronous speeds up to 2,400 bit/sec. The Intertran will be used for synchronous transmissions up to 50 kbit/sec.

For network multiplexing and switching operations, Multitran units will be used and Synchtran devices will provide Datatroute master clocking, a synchronous hierarchy and diagnostic alarm information for TCTS.

Rates for the Dataroute have been filed with appropriate Canadian regulatory bodies, and approval is expected in time to meet the April start-up date, according to a TCTS spokesman.

For Man-CPU Dialogue

Terminal Interface Called Inefficient

By Ronald A. Frank
Of the CW Staff

NEWTON, Mass. – For most types of computers users, "remarkably little has been done to provide an efficient man-machine interface. The user must be protected from the overwhelming mass of data that a CPU can generate while at the same time being able to effectively communicate with the system."

These are the types of problems addressed in a book by James Martin called *Design of Man-Computer Dialogues.*

Up to now mainframe systems have been designed from the inside out based primarily on the capabilities of the CPU. But now they will have to be designed from the outside in, according to Martin.

The ease with which the terminal user can communicate with the system will determine how well he can utilize the system. And the "dialogue" that takes place between the user and his terminal should take into account the shortcomings of both the man and the machine, the author says.

In a section on terminal keyboards, the author contrasts the IBM 3670 stockbroker terminal, which has 178 dedicated function keys, with more free-form devices such as those which have PL/I or Fortran keyboards.

Careful attention should be given to the amount of data displayed at one time to the operator, Martin thinks. Some programmers have a tendency to fill up a display screen simply because it is there. But most alphanumeric dialogues between the terminal and the operator proceed faster if the amount of information on the screen is minimized.

There should be one idea per display and the operator should be asked to respond to only one thought at a time. This is especially critical in "computer-initiated" dialogues, the author says.

Columnar presentation of data on a display terminal is usually most efficient with numbers right-justified and letters left-justified. And short line lengths usually contribute to faster "absorption of the displayed data."

The potential or existing terminal user may find parts of the book frustrating because Martin calls attention to some characteristics over which there is little user control.

For example, the computer response times demanded by varying input methods are often difficult to change. Lines "drawn" on a screen by a light pen should appear faster than a character generated by depressing a key, the author says.

But by viewing the terminal interface as a way to talk to the computer, Martin will make users consider trade-offs that go far beyond the simple hardware constraints of the equipment. The book is available from Prentice-Hall, Englewood Cliffs, N.J.

Most Communication Parameters Monitored by CLA-3000 Analyzer

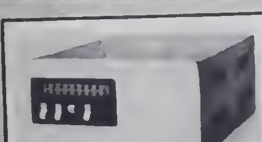
ROCKVILLE, Md. – Penril Data Communications, Inc. has introduced a portable communications line analyzer that is said to save users up to $15,000 compared with comparable test equipment.

Called the CLA-3000, the line analyzer can measure important parameters of a voice-grade line including envelope delay distortion, amplitude response, harmonic and intermodulation distortion, phase jitter, gain and phase hits, impulse noise hits, frequency monitoring and error rates.

Although a technically skilled operator is required to interpret the test readings, the CLA-3000 can function with a transponder located at a remote site. This allows a line to be analyzed without requiring a test instrument at both ends, the spokesman said.

The tester gives data users the same line analysis capabilities as Bell System engineers, the company said. Some functions, such as harmonic and intermodulation distortion, cannot currently be checked by local carriers, a Penril spokesman said.

The CLA-3000 costs $9,300 and a transponder for operation with a remote site would cost about $4,000. Comparable test equipment if purchased separately would cost up to $15,000, the company said. Penril is at 5520 Randolph Road, 20852.



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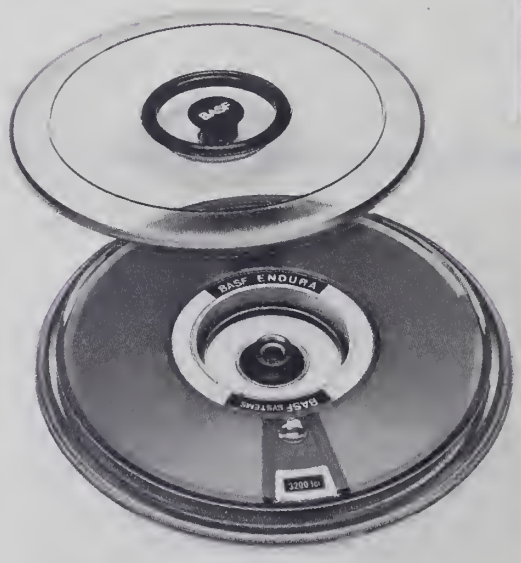

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Digital Links Best

WU Minimizes User-Caused Harm

WASHINGTON, D.C. – There have been no instances of harm to the Western Union communications network during 1972 which were attributable to customer-provided equipment.

This status report on possible harm arising from the interconnection of non-carrier equipment was contained in a letter from Western Union to the FCC.

On digital links, the Western Union transmission network is "rarely susceptible to harm from overload," the letter said. On analog links, "almost all customers" have transmission interface equipment designed to eliminate harm from customer-owned equipment.

Western Union is working with terminal suppliers to make it possible for the customer to own or lease all of the equipment except for a "demarcation terminal block," the letter said. The non-carrier equipment would interface with WU lines at the terminal block.

"There will inevitably be cases where . . . higher than normal signal levels or extraneous voltages" appear on WU lines, the letter from R.H. McConnell, executive vice-president, said. On digital services this is not expected to cause harm to the network since "regenerating equipment in the first central office will effectively block any harm.

"If any isolated instances should be found where a customer's practices are repeatedly causing" a harmful condition, WU will visit the site and explain the situation to the user. But it should rarely happen that a user will persist in causing problems, the letter said.

On lines which WU leases from Bell, telephone company protection standards will apply. But at present 40% of WU's network is non-Bell.

Converter Handles Data Codes

SANTA CLARA, Calif. – Data communications systems incorporating equipment with different code formats, levels or bit rates can now operate with on-line compatibility using the Model 702 Universal Code Converter from Plantronics, Inc.

The Model 702 electronically converts any Ascii, Baudot or other 5-, 6-, 7- or 8-level data signal to any other corresponding code, storing and expanding characters as necessary. Code conversion is accomplished with an MOS ROM programmed to individual user requirements. The memory can be reprogrammed at the factory if system formats change.

Data rates are selected with plug-in "speed chips" programmable from 37.5- to 4,800 bit/sec depending on character storage and expansion requirements. Selectable interface levels are available.

To prevent loss of characters due to code conversion and speed differentials, internal MOS storage can be provided in the Model 702 with a capacity up to 10,000 characters. Additional electronic storage can be added externally.

The Model 702 costs $1,545 with 30-day delivery from 385 Reed St., 95050.

CRT Driver Can Operate With TV Sets

WILLOW GROVE, Pa. – Digi-Log Systems, Inc. has a portable desk-top CRT driver that is compatible with Model 33 TTYs.

Called the Model 209, Telecomputer, the terminal can be acoustically coupled or hardwired. It has a display format of 640 characters, and can operate in half- or full-duplex modes at 110- and 300 bit/sec.

The Model 209 operates with any TV set or video monitor by clipping onto the antenna terminals at the back of the set. A single Model 209 is said to produce "high-resolution" displays on up to 10 displays.

The Model 209 uses a 64-character Ascii set and the keyboard is similar to the Model 33 TTY with additional control keys. Cursor controls, a local/remote switch, scroll and page modes are included.

The standard model includes either TTY current loop or RS 232 interface. Available options include "Here Is" coding, batch transmit capability, 16-key pad, and 9-in. or 12-in. video monitors.

The unit costs $1,295 or $15/mo. Delivery is about 30 days from Digi-Log at 666 Davisville Road, 19090.

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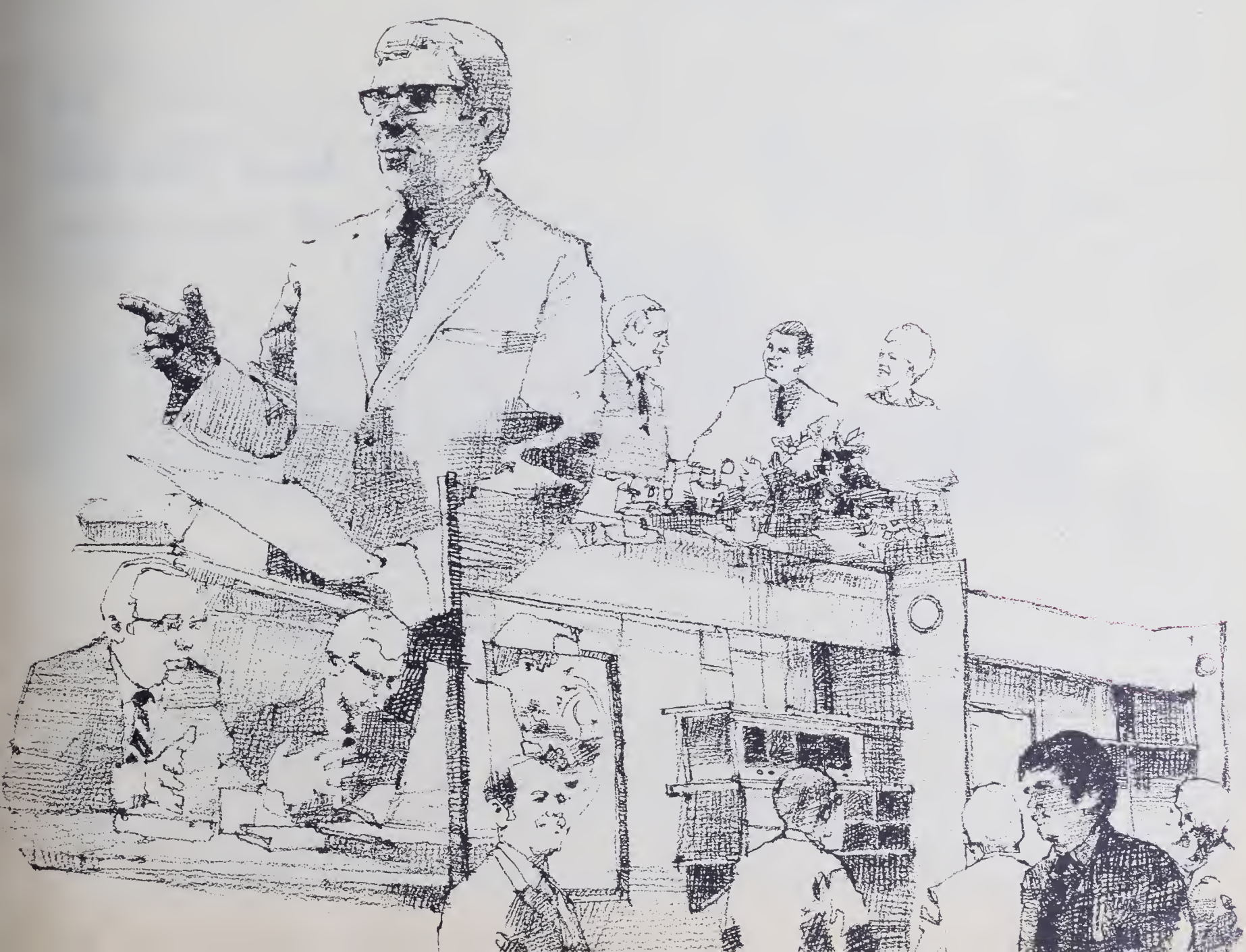

All Attendees Welcome At Afternoon Sessions

Day 1: Hoxie Hits New 'Commo' Lingo

Data Communications jargon is expanding rapidly as technological developments bring new facilities and devices to the markeplace, says consultant Gilbert H. "Gib" Hoxie.

However, he has found that certain often neglected management aspects of data communications planning usually tend to outweigh esoteric technical factors.

Hoxie, a manager in the Informaton Systems Division of Booz, Allen & Hamilton, Inc., addresses the topic of Data Communications Planning on the opening day of the Computer Caravan.

He believes systems planners intending to install or expand data communications applications would be wise to include a "wide range of management considerations" in their analysis.

Answers to the nine questions below may be "key to designing the right system," Hoxie adds.

1. What information systems do we have (need) and why?
2. Which applications require data communications?
3. How well do alternative data communications systems satisfy requirements?
4. What will be the true one-time and operational cost?
5. What will be the true one-time and operations benefits?
6. What will be the impact on users and work-flows?
7. Who are the vendors, and what are they selling?
9. What techniques are most effective in selecting and presenting the best design?

Hoxie attempts to answer these questions during a tutorial on Data Communications Planning, given at 2:30 P.M. on opening day of the Computer Caravan. The open, general session may be attended by people wearning any Computer Caravan badge, i.e. exhibitor, exhibitor-guest, exhibits-only, or Forum program for any day.

Although the presentation will last about an hour, it is anticipated that attendees will have questions for Hoxie.

Beware: Intangible Benefit

Hoxie does not believe in "intangible benefits" of systems, or at least not during the process of cost justification.

"If an analyst can't hang a number, or range of numbers on a 'benefit,' he has no business citing it even as particial justification for a system," he remarks.

"Intangible benefits," which he regards as one of the "major pitfalls for systems planners," only represent "snares and delusions for the individual who must select an alternative, and he is bound to come out on the wrong end of any ensuing conflict," according to Hoxie.

He thus advises that "80% to 90% of intangible benefits can be quantified and user commitments obtained. Those that can't be defined and sized, usually are excluded from the benefits analysis and if they appear in a report at all, are downplayed."

Hoxie's speech is an addition to the Caravan program, in that any Caravan attendee is eligible for admission; it actually sets the stage for the middle-day Forum program, which is devoted to management and operational considerations of data communications.

Last year, three "keynote" speakers toured the country with the Computer Caravan, but the time for these speeches has been given over for extended panel discussions and workshops, a direct result of feedback from the users who attended the 1972 Forum.

The workshops resume after lunch, concluding at 2:30 P.M. At this time, Forum and Exposition attendees may sit in on the open, general sessions on each day. Hoxie's tutorial is given on the first day, a Software Evaluation panel takes place on the middle day and a Small Systems panel is held on closing day.

President's Message

The basic concept of the Computer Caravan is: a national computer conference that travels to you, the computer user.

The fact that the people staffing the exhibit booths are, for the most part, local sales representatives will be appreciated by all those who visit the exhibit. These representatives of DP suppliers will still be here, long after the Caravan has departed.

The idea of tailoring a national conference to the needs of local users is carried to a higher degree by some of the individual exhibitors, who have planned special seminars oriented towards their particular product or service.

Attendees at last year's Caravan said they liked this type of individualized presentation, and more exhibitors have responded by scheduling these seminars.

Whether your main interest is in hardware, software, or services, the leading companies in each sector of the EDP industry are found in our exhibit hall. Both their sales and their technical personnel are prepared for your probing questions on their products, many of which are being introduced on the Caravan, while others are already proven in the field.

Your comments on our program are welcome. Feel free to note your suggestions with *Computerworld* representatives on the exhibit floor, or in the *Computerworld* booth. We are here to serve you; please tell us how we may best accomplish that goal.

Patrick J. McGovern
President, Computerworld, Inc.

Day 2: Panel Probes Software Sources

The Software Evaluation panel is one of three "open" sessions that take place during the afternoons of the Computer Caravan.

These sessions may be attended by people wearing any caravan badge, such as exhibitor, guest, exhibits only, etc.

The Sofwtare Evaluation panel is aimed at examining various sources for applications and utility software; paraphrased, it is a "make-or-buy" round-table discussion, and the audience will be invited to take part.

In general, panelists will follow the outline below. If time permits, questions of a broader nature will be entertained.

I. Evaluating the alternatives
- Where do you start
- The main criteria, how to weigh them
- When you have done enough looking?

II. Pricing, measuring techniques (this relates to first topic, but might be more specific as to cost/CPU time/volume of reports, etc.)

(Continued on S/Page 5)

Day 3: Small Systems Described by Users

Small businesses with computers and businesses with small computers are not necessarily identical, but they will be sharing the stage during our Small Systems panel, on the afternoon (2:30) of the final day.

This panel is designed to give a broad overview of the types of systems available, and the problems and opportunities presented by these computers.

In many instances, such systems are chosen by company presidents with little or no DP experience; in other cases, on-line systems may be operated by clerical personnel.

In all cases, it appears small computers are proliferating the business community at an unprecedented rate, and this panel session attempts to take a snapshot of local small-computer usage today.

Again, panelists will be following the outline below, and any questions of a broader nature will be taken, if time permits.

I. Planning
- Discovering the need (growth; new business;

(Continued on S/Page 5)

Many Titles Suit DP Conferences

Few generalities can be applied to the Computer Caravan, with one possible exception: computer conferences are many things to many people.

The 1973 edition of *Computerworld's* traveling show is the distillation of user and exhibitor recommendations after our 1972 debut; most people approved of the local concept, since it afforded them an opportunity to speak with users and DP suppliers from their own region.

This has remained unchanged.

Again, local and regional users comprise the panel discussions and will be leading workshops.

Again, local sales and technical representatives will be staffing the booths in the exhibit hall.

The Computer Caravan, then, is a management conference with a program geared to increasing the operational efficiency of computer centers.

It is a business exposition, with the latest in computer hardware, software and services on display.

It is a showroom for exhibitors,

(Continued on S/Page 6)

Hazeltine 2000 System

1. Start with the CRT Terminal that's No. 1 in Price/Performance.

☐ 1998-Character Display ☐ Selectable Transmission Rates up to 9600 bps ☐ Full-Duplex, Half-Duplex and Batch Operating Modes ☐ Two-Level Video Intensity Split Screen ☐ Automatic Tabulation ☐ Editing Capability ☐ Random Access Memory

$88 PER MONTH*

2. Add the powerful, high-speed "dual" Tape Cassette Unit.

☐ On/Off-Line Data Storage & Retrieval ☐ Paper Tape Emulation and Page Operating Modes ☐ 2400 Baud Data Transfer Rate.

$79 PER MONTH*

3. Or add the Printer Unit for silent hard copy.

☐ Conversation and Page Operating Modes ☐ Print Rates up to 30 Characters Per Sec.

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4. Put them all together for complete System capability.

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SOUTH: DALLAS (214) 233-7776 ☐ ATLANTA (404) 458-9360 ☐ HOUSTON (713) 622-0551 ☐ WASHINGTON, D.C. (703) 979-5500
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See it at the caravan!

New CULPRIT, Version III

Visit our caravan booth – or better yet – attend a Cullinane seminar at any of the ten caravan cities.* You'll get all the details on the newest version of the EDP-AUDITOR/CULPRIT system as well as the latest enhancements to the Data Base Management versions (IMS/CULPRIT, TOTAL/CULPRIT, and RDMS/CULPRIT).

The CULPRIT family of systems has been among the most successful in the industry because we've always stayed well ahead of the industry.

If you'd like some idea of how far ahead we've jumped this time, read through the following long (but vitally important!) list of new features:

CULPRIT III

- ☐ Special forms facility allows individual handling for each report calling for special forms.
- ☐ Input record size can now be up to 8,192 bytes long.
- ☐ Procedure buffer size has been doubled in size allowing more procedure parameters to handle very complex reports.
- ☐ Well organized and easy to read input parameter listing
- ☐ Table look up.
- ☐ Redefinition of output lines to allow greater output format flexibility.
- ☐ 8-character field names for improved data dictionary mnemonics.
- ☐ New "0" Parameter greatly simplifies certain calculations at total time related to values accumulated at input time.
- ☐ All Assembly Language coding eliminates COBOL modules and reduces core requirements by 3K.

SPECIAL CULPRIT MODULES

- ☐ Parameterized file matching (user specifies size and location of keys at run time).
- ☐ Index sequential random read routine.
- ☐ IBM-DDA file match and expansion modules which are valuable to banks using IBM's Demand Deposit Accounting System.
- ☐ Occurs repeating segment module which handles Occurs or "Occurs Depending On" segment types.
- ☐ GE 400 Series tape read module for reading GE 400 tapes directly on IBM computer.
- ☐ RCA 301 Series tape read module for reading RCA 301 tapes directly on IBM computer.
- ☐ VISAM file read module.
- ☐ Label output module which produces 2, 3, 4, 5-up labels simply.
- ☐ Splitter output module permits the specification and printing of any number of lines from a single record.
- ☐ Bit-testing module.

DATA BASE MANAGEMENT VERSIONS

IMS/CULPRIT

- ☐ User may provide SSA's to allow selected segment retrieval or to access segments randomly.
- ☐ 8,192 byte segments or segment strings allowed.
- ☐ Access two or more IMS files at the same time.
- ☐ Access non-IMS files during an IMS run.
- ☐ Access HDAM, HIDAM, HISAM files, physical or logical.
- ☐ Enhanced data dictionary capability.
- ☐ Also includes all features listed above under CULPRIT.

RDMS/CULPRIT

- ☐ Information available from the Control, DATA, and XREF portions of RDAM records.
- ☐ Automatic expansion of compressed format data fields to any size desired by the user.
- ☐ Employs cataloguing feature eliminating need to define logical fields in report parameter cards.
- ☐ Processes a virtually unlimited number of strings through the data base.
- ☐ Reads initial driving file in a string either directly or sequentially. All other reads are direct.
- ☐ Direct reads can be based on keys submitted by user and/or keys read from a non-RDMS file.
- ☐ Chaining across files through XREF entries handled automatically by the system.
- ☐ Handles single file record cross referencing techniques (e.g., Bill of Materials organization).
- ☐ Includes all features listed under CULPRIT sections.

TOTAL/CULPRIT

- ☐ Information available from the entire TOTAL record including root and linkage segments.
- ☐ Employs a cataloguing feature eliminating the need to define logical fields in report parameter cards.
- ☐ Processes a virtually unlimited number of strings through the data base. Each string may be several files long.
- ☐ Reads initial driving file in a string either directly or sequentially. All other reads are direct.
- ☐ Direct reads can be based on keys submitted by users and/or keys read from a non-TOTAL file.
- ☐ Linking between files and reading of variable chains handled automatically by the system.
- ☐ Handles multiple linkages between a master and/or variable file (e.g., Bill of Materials organization).
- ☐ Access all types of files.
- ☐ Includes all features listed under CULPRIT section.

*Free Tickets:

pay $5 at the door . . . or . . . if you plan to attend the Cullinane seminar, drop us a note for free ones (while they last) plus an advance brochure on any system listed above. Cullinane seminars will be held from 4 to 5 p.m., second day of each session, immediately after software forum.

Cullinane Corporation

Cullinane Corporation

One Boston Place, Boston, Massachusetts 02108. Telephone (617) 742-8656.

Exhibitors Set Special Seminars

The following exhibitors will be sponsoring seminars in the various cities visited by the Caravan. Consult the table below for times and cities. Check with individual exhibitors for exact topics in each city and availability of space.

DAY 1	Boston	Washington, D.C.	New York	Atlanta	Houston	Anaheim	San Francisco	Kansas City	Chicago	Cleveland
2:30 p.m.										
Iomec	★	★	★	★	★	★	★	★	★	★
4:00 p.m.										
Sycor	★	★	★	★	★	★	★	★	★	★
DAY 2										
2:30 p.m.										
Iomec	★	★	★	★	★	★	★	★	★	★
Interdata	★	★	★	★	★	★	★			
ICC	★	★	★	★	★	★	★	★	★	★
Varian*		★	★	★		★				★
3:30 p.m.										
Tektronix			★	★				★	★	
Varian*		★	★	★		★		★		★
4:00 p.m.										
Cullinane	★	★	★	★	★	★	★	★	★	★
Infotron	★	★	★	★	★	★	★	★	★	★
4:30 p.m.										
Varian*	★									
DAY 3										
4:00 p.m.										
Western Union Data Services	★ (may run in all cities based on Boston interest)									
BCS				★						

*By invitation only.

Need Minicomputer application data ?

GET IT IN WRITING AT CINCINNATI MILACRON

When you visit the Cincinnati Milacron exhibit at the Computer Caravan, we won't just talk minicomputer capability . . . you'll get it in writing. Application specialists will be there to help you with your specific needs . . . they'll be able to tell you what's needed, how it will work and what it will provide. They'll be backed up by a minicomputer system that will provide component and unit pricing . . . in writing. If you want specific application information, you'll get it at Cincinnati Milacron . . . in writing. Process Controls Division, Cincinnati Milacron, Lebanon, Ohio 45036.

minicomputers

CINCINNATI MILACRON

Caravan Staff

From the several offices of the vast *Computerworld* organization comes the staff that has supported and is now conducting the Computer Caravan.

This staff is composed of former show people, current industry figures and sales experts, editorial people, and the all-important registration and office personnel.

The variety in their backgrounds is too detailed for presentation here, especially since all are full-time computer-conference specialists for late Winter and early Spring 1973.

The hundreds of hours of extra work, weeks and months of travel, and the valuable experience during all this hectic activity both this year and in 1972, are all reflected in a bigger Exposition and a more comprehensive Forum program for Computer Caravan/73.

Here are the people that are making it all possible. A special message from the Publisher and Caravan President is found on page 2. Special acknowledgement goes to Leslie Flanagan, who did all this photography work; not pictured is Bob Rankin, caravan manager, who was on the road during the entire time that this section of the Caravan Supplement was being "put to bed."

Neal Wilder
exhibit sales
manager

Dottie Travis
exhibit sales
administrator

Ed Bride
forum manager

John Meade
caravan activity
coordinator

Leo Bowser
caravan manager

Edward "Ted" Bloom
registration director

Tamar Shapiro
asst. registration
director

Frani Blackler
caravan secretary

Linda Collins
caravan secretary

Beverly Butters
caravan secretary

Day 2: Panel Probes Software Sources

(Continued from S/Page 2)

III. What-if (recovery techniques)

• How to recover, in various situations. What if the system does not respond to your normal procedures?

• Examining your sources of applications and utilities, in light of expected problems (cost/performance again)

(1) Cost of failures

(2) Expertise (how to retain or keep good software people or suppliers)

(3) What have your colleagues done?

IV. Next stept?

• Your growth, and how it could affect software selection

• Impact of hardware changes on software sources

• Stability of the source (manufacturer, software house, etc.)

1974 COMPUTER CARAVAN SCHEDULE

Atlanta	February 26-28, 1974
Houston	March 5-7, 1974
Anaheim	March 20-22, 1974
San Francisco	March 26-28, 1974
St. Louis	April 3-5, 1974
Chicago	April 9-11, 1974
Cincinnati	April 16-18, 1974
New York	April 23-25, 1974
Boston	April 30–May 2, 1974
Washington, D.C.	May 7-9, 1974

Day 3: Small Systems Described by Users

(Continued from S/Page 2)

costs, etc)

• Vendor proposals (how you evaluated them)

• Procurement

(1) Problems unique to small businesses

(2) Financial peculiarities (contract flexibility, etc)

II. Operation

• Most common problems vs. chief advantages

(1) Who solves what kinds of problems, why?

(2) As a class, how does the equipment work

• New Applications

(1) Who develops, maintains

(2) Upgrades to larger configuration *vs* additional small systems

• Optional items

(1) Independent peripherals and supplies

(2) Independent software

(3) Vendor *vs* in-house training.

III. Review

• "What could we have changed, to make it better?"

• How does a small business look back on a computer procurement?

10% OFF THE PURCHASE PRICE* IF YOU CAN...

BEAT THE SYSTEMS

The SYSTEMS 72 computer, that is. It's programmed to shoot craps with you in our booth at the Computer Caravan, and the stakes are pretty impressive.

Like, 10% OFF THE PURCHASE PRICE OF A SYSTEMS 72 if you can run your winnings up to $1,500. We start you off with $500 "credit."

Just to keep our 72 from getting bored, we'll be running FORTRAN, BASIC, and batch on it at the same time it's shooting craps. That's only typical of the power and versatility of the 72, the first small virtual-memory computer. It combines the advanced problem-solving capabilities of much larger computers with the ease of operation and economy of minicomputers.

The SYSTEMS 72 features:
☐ time-sharing ☐ virtual memory
☐ reentrant FORTRAN/BASIC
☐ multiprogramming ☐ all processors available to users console simultaneously.

So don't crap out. You've got plenty to gain for your company. And nothing to lose. Come on in and BEAT THE SYSTEMS.

If you can't make it to the show, write for our SYSTEMS 72 brochure, SYSTEMS Engineering Laboratories, 6901 W. Sunrise Boulevard, Fort Lauderdale, Florida 33313.

*Discount limited to one per company. Void where prohibited by law.

SYSTEMS
ENGINEERING LABORATORIES

Many Titles Suit DP Conferences

(Continued from S/Page 2)

who have invited people who they know might be interested in a certain facet of computer technology, or in certain products.

It is also a learning experience, not only in the regular Forum program, but also because of the special exhibitor seminars, where potential customers can learn about equipment capabilities and selection criteria.

So the Computer Caravan/73 is indeed many things to many people, but we don't have to stop there. Through your valuable feedback, either through Forum evaluation forms or face-to-face contact with us, we can plan the 1974 program to fill a broader spectrum of needs.

Exhibitor Listings

The following is an alphabetical listing of exhibitors in the 1973 Computer Caravan, and a brief description of the products and services to be displayed.

AMERICAN TELEPHONE & TELEGRAPH COMPANY
680 Fifth Avenue
New York, N.Y. 10019
Tel: (212) 393-2101

The visitor to the Computer Caravan/73 can see the highlights of the Bell System's approach to moving data. AT&T will feature the high-speed "dataphone 4800," first in a new family of data sets from the Bell System. The 4800 data set was designed for economical transmission at 4800 b.p.s over basic unconditioned private line facilities.

Also on display will be the Bell System's 85 A-1 Selective Calling System for polling applications. The system is a quiet, efficient way of information movement, generating management advice and systems reports in real time.

***

AMPEX COMPUTER PRODUCTS DIVISION
13031 W. Jefferson Blvd.
Marina del Rey, Calif. 90291
Tel: (213) 831-8933

Complete semiconductor, core, tape and disk system as plug-to-plug replacements for IBM 370 and 360 Computers, Univac 400 and 1100 computers and memories for DEC PDP-10 computers. Features will be the unique Ampex two-in-one TM-34 for 360 and 370 computers – two 3420 replacement tape drives in one cabinet that reduces space requirements by nearly 50%. The Ampex DS-330 disk subsystem, a plug-interchangeable replacement for either the 3330 or 3333.

Information will also be available on the complete line of Ampex mainframe memories for IBM 370/360, Univac, and DEC computers.

***

ANDERSON JACOBSON, INC.
1065 Morse Avenue
Sunnyvale, Calif. 94086
Tel: (408) 734-4030

Since its beginning in early 1967 as a manufacturer of one of the first acoustic data couplers, Anderson Jacobson, Inc. has continued to develop products for the data communications and computer terminals markets. At the present time the data communications products include a variety of 150 BAUD, 300 BAUD, 450 BAUD modems and acoustic couplers as well as a 1200 BAUD which is believed to be the only one of its kind in production today. These modems and couplers are available as stand alone units, as building blocks for a multiple modem system or as basic units for OEM applications.

The computer terminal line grew out of an early product wherein an acoustic coupler was designed to become an integral part of a teletype machine. This type of terminal with certain improvements and modifications is still in production today. In addition, an auto-answer version is the AJ841 which is based on a proprietary design that utilizes the heavy duty IBM Selectric mechanism as a printer. The third basic product of this line is a new model, the AJ630 which is a 30 character per second, non-impact printer terminal.

Anderson Jacobson maintains sales and service offices in principle cities throughout the country.

***

AUERBACH PUBLISHERS INC.
121 North Broad Street
Philadelphia, Pa. 19107
Tel: (215) 491-8212

AUERBACH Publishers is introducing its new DATA PROCESSING MANUAL during the Caravan with a special pre-publication subscription offer. This new service provides practical advice, techniques, checklists and other aids for helping DP managers solve their daily operating and managing problems. It comes in portfolio format for easy filing and reference. Also on display is the complete line of AUERBACH Computer Technology Reports, the encyclopedic standard reference for the EDP industry. These services provide all the facts, prices, performance data, configurations and technology background analysts need to make meaningful evaluations and selections of euqipment or services. Professional reference books in the fields of computer

Ampex gives you more than you asked for... again

Ampex' newest space saver...the 3420-compatible two-in-one tape subsystem for 360 and 370 computers

The biggest news since Ampex pioneered tape recording is the new two-in-one configuration for the Ampex TC-38/TM-34 tape subsystem. Now you can reduce the amount of space for tape drives and controllers in your DP center by nearly 50%...or double the number of drives without allocating more space. You can get two high performance 3420-compatible tape drives with data rates to 200 KB, in a single cabinet only a little larger than one individually mounted tape drive. It's such a logical idea, it's amazing no one thought of it before.

But space reduction is only the beginning. The autothread on the TM-34 now is equipped with an exclusive "halo of air" that vastly improves threading without the reel-surround cartridge. The tape will literally thread itself from any position. Furthermore, the TM-34 has an automatic reel latch that forever eliminates manually operated locking levers or buttons. And, of course, this drive has a radial interface for operation with either the Ampex TC-38 or the IBM 3803 controller.

Format configurations include any combination of 9-track, single or dual density, and 7-track with data rates from 60 to 200 KB.

If you want extra value with every peripheral product, call your Ampex Computer Specialist today. He can solve your space and budget problems with disk drives and memory enhancements, too.

AMPEX

AMPEX COMPUTER PRODUCTS DIVISION
13031 West Jefferson Boulevard
Marina del Rey, Ca 90291, (213) 821-8933

People who think this far ahead are thinking BASF/2000A.D.

BASF/2000 A.D. The computer tape as advanced as your next idea. It's being used more and more. In aerospace technology. In advanced time-sharing operations. In university research, and business data storage. Any place where the margin for error is critical.

BASF/2000 A.D. The 100% certified 3200 fci tape that combines greater sensitivity and error-free uniformity with a thinner, less abrasive coating. The tape that actually reduces head-wear while ensuring reliability you can live with for years.

BASF/2000 A.D. If you're in the business of planning for tomorrow, or just keeping up with today, it should be part of your future.

Start thinking 2000 A.D. Talk to your BASF representative now. Or send for all the facts on our full line of magnetic media products.

BASF SYSTEMS
Division of BASF Wyandotte Corporation

Crosby Drive, Bedford,
MA 01730.

BASF

BASF for people who really know.

science, data processing and management science are also on display and can be examined at your leisure.

***

BASF SYSTEMS
Crosby Drive
Bedford, Mass. 01730
Tel: (617) 271-4000

BASF Systems, the world's leading media supplier, will display its complete line of computer tapes, including the new BASF/endura, and the premium BASF/2000 A.D., as well as its full line of disk packs.

BASF's 2000 A.D. uses a new 'Hotter' oxide and a new thinner, harder coating for those applications requiring premium quality which exceeds industry standards.

BASF/endura offers computer users optimum prize/performance at low initial cost. Both tapes meet not only today's transport requirements, but future 3200 bpi – 6400 FCI expectations as well.

BASF disk packs are fully compatible with most major computer equipment.

On display will be the new 1236 (3336 compatible), the 1112 (200 tracks per inch 2316), the 'FLOPPY DISK,' and a full line of compatible disk packs.

***

BOEING COMPUTER SERVICES, INC.
P. O. Box 708
Dover, N.J. 07801
Tel: (201) 361-2121

BCS offers comprehensive support with product lines that include computer time, programming, consulting, training, data base services; applications that include general business and financial systems, scientific and engineering techniques, management and computer operating systems.

BCS operates from 24 sales offices located throughout the United States. Data Centers are maintained at Seattle, Philadelphia, Wichita, Huntsville and Washington, D.C. with over $100,000,000 worth of equipment on order to provide maximum computer flexibility.

***

CAMBRIDGE MEMORIES, INC.
969 Virginia Road
Concord, Mass. 01742
Tel: (617) 259-9880

Cambridge Memories, with headquarters in Concord, Mass. and plants in Newton, Mass. and Tijuana, Mexico is a full-line supplier of memory systems used as add-on or replacement main memories for IBM systems 360 Models 22, 30, 40, 50 and 65 as well as System 370 Models 155 and 165 computers and numerous minicomputers such as Digital Equipment's PDP-11 line and the Varian 620/i. It also manufacturers ferrite core, semi-conductor and moving magnetic domain (DOT) memory systems for use in computer processors, peripheral equipment and terminal devices.

CENTRONICS DATA COMPUTER CORPORATION
One Wall Street
Hudson, N.H. 03051
Tel: (603) 883-0111

The popular Centronics dot matrix serial impact printers feature speeds of 100 to 330 characters per second and 60 to 200 lines per minute. The recently introduced 80 column Model 306 printer, priced at $1,995, is one of the highlighted products. The low cost Centronics Model 401 CRT terminal, priced at $1,495, allows keyboard controlled data entry, editing and communications capabilities for system on-line and off-line operations. A wide variety of popular communications and computer interfaces are available to meet most system requirements.

***

CIG COMPUTER PRODUCTS, INC.
1351 Washington Blvd.
Stamford, Conn. 06902
Tel: (203) 359-2100

CIG Computer Products, Inc. markets and services computer products and systems throughout the world.

CIG 370 Package Leasing
– Flexibility
– Savings up to 60%
– Graduated growth with early terminal options CIG-Data Recall Mark II Memory
– Four component design
– Failsafe reliability
– IBM 370 Memory (Virtual Storage)
– IBM 360 (all models)
– UNIVAC CIG I/O Channels
– 360/370 Block Multiplexer Channel
– 360/370 Selector Channels
– 360/370 Multiplexer Channel CIG Disk Subsystems CIG Tape Subsystems CIG/EDOS (Extended Disk Operating System)

***

CINCINNATI MILACRON, PROCESS CONTROLS DIVISION
Lebanon, Ohio 45036
Tel: (513) 494-5486

Cincinnati Milacron, manufacturer of reliable general-purpose minicomputers, wants you to "get it in writing." Tell us your applications and we will produce a proposal within minutes.

A CIP/2200 minicomputer based system displays all the relevant information on a CRT. You select the components needed, and the CIP minicomputer system automatically produces your proposal. See this unique system in operation and get full details on the economy and reliability of minicomputers from Cincinnati Milacron.

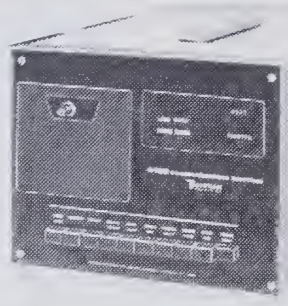
***

COMPUTER DEVICES, INC.
9 Ray Avenue
Burlington, Mass. 01803
Tel: (617) 273-1550

Computer Devices, Inc., a TechVan Corporate Partner, manufactures the TELETERM family of low-cost time-sharing terminals and printers.

TECHTRAN

#1 in reliable High Speed Cassette Communications Terminals!



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perdata

PER DATA'S New Easy Load 1600 cpi TAPE TRANSPORT

See Me "SPIN MY REELS" At The COMPUTER CARAVAN

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All TELETERMS are rugged and dependable, utilizing a thermal (non-impact) printing technique for printing. Weighing only 22 pounds and fitting under an airline seat, the CDI 1030 TELETERM is being shown at the Computer Caravan in three exciting useful, NEW models:

CDI 1030 APL – the first portable terminal for the APL user. Available in ASCII code or EBCD as a direct replacement for the popular IBM 2741 APL device.

CDI 1030/MULTICS – the first portable with a MULTICS keyboard.

CDI 1030/ACT – for a time-sharing network. Communicates with other 1030's, TTY or time-sharing computers directly.

***

COMPUTER TRANSCEIVER SYSTEM INC.
66 Midland Avenue
Paramus, N.J. 07652
Tel: (201) 261-2800

Manufacturers of EXECUPORT® high speed data terminals for remote data collection & Transmission. CTSI will demonstrate their portable, quiet 310 series; the new model 1200 with speeds to 120 CPS; the new model 625 Paper Tape Punch & Reader; and the new 420 magnetic tape memory unit for off-line collection/storage/transmission of data through cassette recording. The equipment is characterized by extreme reliability: MTBF = less than one service call per year.

***

CULLINANE CORPORATION
One Boston Place
Boston, Mass. 02108
Tel: (617) 742-8656

Cullinane Corporation will feature at The Computer Caravan its proprietary software products including those for use with data base management systems. These products are CULPRIT, IMS/CULPRIT, TOTAL/CULPRIT, RDMS/CULPRIT and user department versions including EDP-AUDITOR, PERSONNEL-EDP-REPORTER, MARKET-EDP-ANALYZER, PORTFOLIO-EDP-REPORTER and PAYOUT. In addition, a seminar on the EDP-AUDITOR/CULPRIT Systems will be held from 4 to 5 PM on the second day of each show. Participants in the seminars will be able to attend the Computer Caravan free of charge as guests of the Cullinane Corporation.

Those wishing additional information may contact the Cullinane Corporation at its booth at The Computer Caravan or calling (617) 742-8656.

***

DATA DISC, INC.
686 W. Maude Avenue
Sunnyvale, Calif. 94086
(408) 732-7330

Data Disc, Inc. will exhibit its ANAGRAPH Display System. IBM 360/370 users will see an operational system which not only offers IBM 2260 emulation but also provides truly versatile graphic display capability. OEM's will be able to see Data Disc products at work in an operating system.

ANAGRAPH provides up to 32 users with low cost TV terminals. Image storage and refresh is independent of the CPU. ANAGRAPH employs a minicomputer, TV terminals, keyboards, a Data Disc head per track disc memory, a Data Disc graphic display system and a Bright Industries IBM compatible magnetic tape drive to provide a cost effective system with grow power!

***

DATA GENERAL CORPORATION
Route 9
Southboro, Mass. 01772
Tel: (617) 485-9100

Minicomputers, peripherals, and software. (Full listing on Page S/16.)

DATAPRO RESEARCH CORP.
One Corporate Center
Route 38
Moorestown, N.J. 08057
Tel: (609) 234-4300

Datapro Research Corporation is displaying DATAPRO 70, the most widely used data processing reference service in the world. DATAPRO 70 is unique among reference services in that it provides monthly updated product reports on all important EDP hardware and software products – in one convenient three-volume set. DATAPRO 70 provides fast reports on new products to keep you up to date, plus in-depth product analyses to help you in planning EDP systems and selecting equipment. The DATAPRO 70 service also includes personalized consulting by telephone, and NEWSCOM, a monthly newsletter on significant product trends and developments.

DATA PRODUCTS CORPORATION
6219 DeSoto Avenue
Woodland Hills, Calif 91304
Tel: (213) 887-8000

LINE PRINTERS

– Medium to high speed impact printers: for OEM systems ranging from low cost minicomputers and terminals to high speed EDP systems.

– Satellite Printers: for economical off line printing. CORE MEMORY PRODUCTS.

– Memory Systems: a complete line for applications ranging from mainframe to bulk storage in commercial and military systems. Also, plug compatible replacement memories.

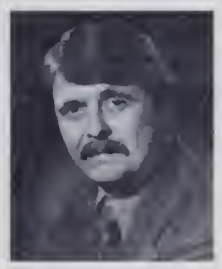
– Stacks: customized to your needs.

– Cores: sizes from 14- to 30-mil. COMPUTERIZED DISTRIBUTION

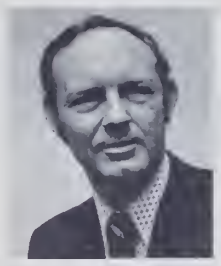
If you have any questions about data communication...

Don't ask me!

Bring your questions to the Computer Caravan and ask these fellows in the ICC booth.



Matt Kenny
V.P.-Sales



Jon Blasdell
National Accts. Sales Mgr.

Bob Toombs
Southeastern Reg. Sales Mgr

Tom Aven
Western Reg. Sales Mgr

Sid Haw
Western Reg. Accts. Executive

Phil Coveney
Sales Representative

Rusty Hays
Sales Representative

ICC

International Communications Corporation
7620 N.W. 36th Avenue, Miami, Florida 33147
Telephone 305 + 691-1220 305 + 836-4550
In Europe: RACAL-MILGO LIMITED Reading, Berks, England

a milgo company

3-14 © 1973

MANAGEMENT SYSTEMS
– CODONS's: dedicated system that slashes distribution cost COMMUNICATIONS
– DataPak-Multiplexing Systems: for reducing data transmission costs.
– DETECT test set, for quickly locating network failures.

***

DECISION
5601 College Avenue
Oakland, Calif. 94618
Tel: (415) 654-8626

Decision will be showing three newly announced products and systems: the Data General NOVA compatible line of peripheral controllers, systems, a new real-time operating system, and innovative Optical Page Reader and DECISION's Optical Data Entry System.

The Model 3170 controller plugs into the NOVA line providing a minimum of 11.6 megabytes of storage from a Diablo, Caelus or Wangco 5440 top loading cartridge disk drive. Another featured peripheral is the Model 3180 phase encoded 1600 bpi tape drive controller.

A key product introduction is the DINOS family of NOVA operating systems. DINOS I, II and III are high performance, low-cost and more useful answers to Data General's RDOS.

Decision's Model OMR 6500 Optical Reader involves a new concept which scans a fixed page in contrast to the conventional approach of moving the page across the scanning device. The result is greater throughput with minimum opportunity for error. The OMR 6500 has many options, broad flexibility of input data forms and inherent design simplicity that maximizes ease of maintenance.

Decision's Optical Data Entry System evolves around the Model OMR 6500 and provides users with the first proven computer base Optical Data Entry System.

***

DELTA DATA SYSTEMS CORPORATION
Woodhaven Industrial Park
Cornwell Heights, Pa. 19020
Tel: (215) 639-9400

DELTA will exhibit a typical video display terminal system which includes a terminal with special function keyboard, a cassete recorder, and a line printer. The company will also show its DELTA 5000 video display terminal and Multi-Term programmable terminal multiplexer. These and other DELTA products offer unique features such as special character generators, upper/lower case, PAGING, built-in interfaces for computer/terminal compatibility, 3000-character memory, and others, all designed to solve difficult terminal system problems.

***

EASTMAN KODAK COMPANY
Business Systems Markets Division
343 State Street
Rochester, N.Y. 14650
Tel: (716) 724-4745

Eastman Kodak will show how KODAK KOM Microfilmers contribute to Computer Output Management. Various pieces of microfilm retrieval hardware, including the KODAK EKTALITE Reader, will be featured. Microfilm systems specialists will be available to discuss your computer output requirements and to show how computer output microfilm can provide added output flexibility to your DP shop.

***

ELECTRONIC MEMORIES & MAGNETICS
12621 Chardon
Hawthorne, Calif. 90250
Tel: (213) 644-9881

EMM MICROMEMORY Processor Storage Systems
Interfaces with System/360 and System/370 computers. Storage capacity: 16,384 to 3,145,728 bytes. Cycle time: 750 nanoseconds to 2.5 microseconds. Large card design for easy maintenance. Permits model and capacity changes in the field. Internal power module protects stored data in case of power failure.
CAELUS DISK MEDIA
CMCX DISK PACK for System/370
CMIII DISK CARTRIDGE for System/3
CMI DISK CARTRIDGE for new low cost systems
PGI 844 UNIVERSAL CONTROLLER AND DISK SYSTEM
Interfaces with System/360 and System/370 computers. Handles intermixed track densities and variety of I/O devices. Controller MTBF of 10,000 hours. 10% as large as 2314 controller. Interchangeable plug-in cards simplify maintenance. Test mode option permits off-line media verification.

***

ENTREX, INC.
168 Middlesex Tpke.
Burlington, Mass. 01803
Tel: (617) 273-0480

ENTREX, INC. the leading manufacturer of Key-to-Disk data entry equipment including a preview of new, improved software. ENTREX will demonstrate the system's extensive editing capabilities and validity checks, including crossfooting and subtotaling.

A highlight of the ENTREX Exhibit is the introduction of the new System 280, a low cost key-to-disk

13 reasons why you should go to the Computer Caravan.

iomec inc Model 2560 Reader
New high-speed reader – first 1,000 cps reader at less than $1,000.

iomec inc Model 7470 Punch/Reader
New punch/reader combination with speeds up to 70 cps punch and 400 cps read. Easy loading and chad removal with no need to slide unit out from panel.

iomec inc Model 2016 Reader
New low-cost reader – 150 cps asynchronous. Lensless optical system. Single moving part.

iomec inc Model 170 Punch
New 170 cps punch–motor driven interposer for positive perforating. Echo read-after-write check-back optional. Easy front panel loading. Adjusts to paper width automatically.

iomec inc Model 2032 Reader
New medium-speed reader – single moving part, 300 cps asynchronous and 400 cps synchronous. Lensless optical system.

iomec inc Iodisc Drive Model 3404
New iodisc Series 3000 top-loading disc drive – 200 tracks/inch using IBM-type 5440 cartridge. 60 msec average access time and 96 million bit capacity. Light weight and small enough to easily fit 24-inch deep standard rack.

iomec inc Iodisc Drive Model 31
New iodisc Series One includes fixed and removable disc for combination of inexpensive removable media system with mass storage add-on capability.

iomec inc Model 4040 Reader/Handler
New reader/handler combination – field-proven 2540 in one integrated unit with servo-controlled handler. Electrical noise has been eliminated.

iomec inc Iotape Controller Model 101
New Series Three Controller card mounted Cartritape drive for plug-in directly inside your minicomputer. Provides extremely large capacity, slow-speed ROM. Ideal compact program loader.

iomec inc Model 40 Portaverter
New Portable Numeric Data Entry System for inventory accounting, order entry, stock replenishment and financial transactions. Completely self-contained with magnetic cartridge data storage.

iomec inc Model 202 Printer
New line printer – varied font sets and multi-font buffer automatically adjust to speeds of 142, 202, 256 and 526 lines per minute. Highest quality printing on 6-part – or more – forms.

iomec inc Iotape Controller Model 9100
New plug-in Controller for low-cost Series Ten magnetic tape transport handles both 800 cpi NRZI and 1600 cpi formatters at the same time. Each formatter controls up to 4 tape drives.

iomec inc Iotape Transport Model 313
New iotape Series Three triple (Model 313), dual (Model 312) and single (Model 311) Cartritape drive-pacs. Large capacity magnetic tape cartridge for reel-to-reel performance.

The new iomates. See them all in
Boston – Feb. 13-15: Washington – Feb. 20-22.
New York – March 5-7. Atlanta – Mar. 13-15. Houston – Mar. 20-22.

Our systems are going to town.

It's time for another dynamic Caravan showing. This year, we're featuring a multi-terminal, on-line data entry system in a multi-task environment. The extremely flexible, 630 nsec, multi-bus V 73 is on your track. Commanding an order entry program running under our VORTEX operating executive with print-out in hard copy on our super-versatile STATOS 31® printer/plotter. And just about every bell and whistle of modern technology. A total systems capability that solves a broad range of complex systems applications problems. Faster. And with more efficiency and flexibility than anything else you'll see around.

V73 with VORTEX

You'll view a real-time operating system at its best. CRT's operating independently of each other simultaneously, show the multi-tasking capability with foreground tasks in a real-time environment. Note that VORTEX has automatic checkpoint/restart and dynamic memory allocation for most efficient usage. After you've seen the flexibility of VORTEX in action and our new V73 doing its fast and powerful stuff, you'll wonder why it doesn't cost more. Especially when you consider its multiple path interfacing between processors and memories and I/O's.

STATOS

Here's where you'll get your hands on the results of your order entry program. You'll see the immediate output from two or more tasks—each of which outputs data direct to the STATOS 31. Fast. A capability of printing upper and lower case characters at up to 1,000 lines per minute. With definition that really pops right out at you. Without degrading the performance of the overall system. Let your imagination run wild. Enter any order you can think of in any quantity for up to ten different items. When you finish placing your order, you'll see an instant print-out on the STATOS 31 printer/plotter—complete even to the shipping label.

ADAPTS

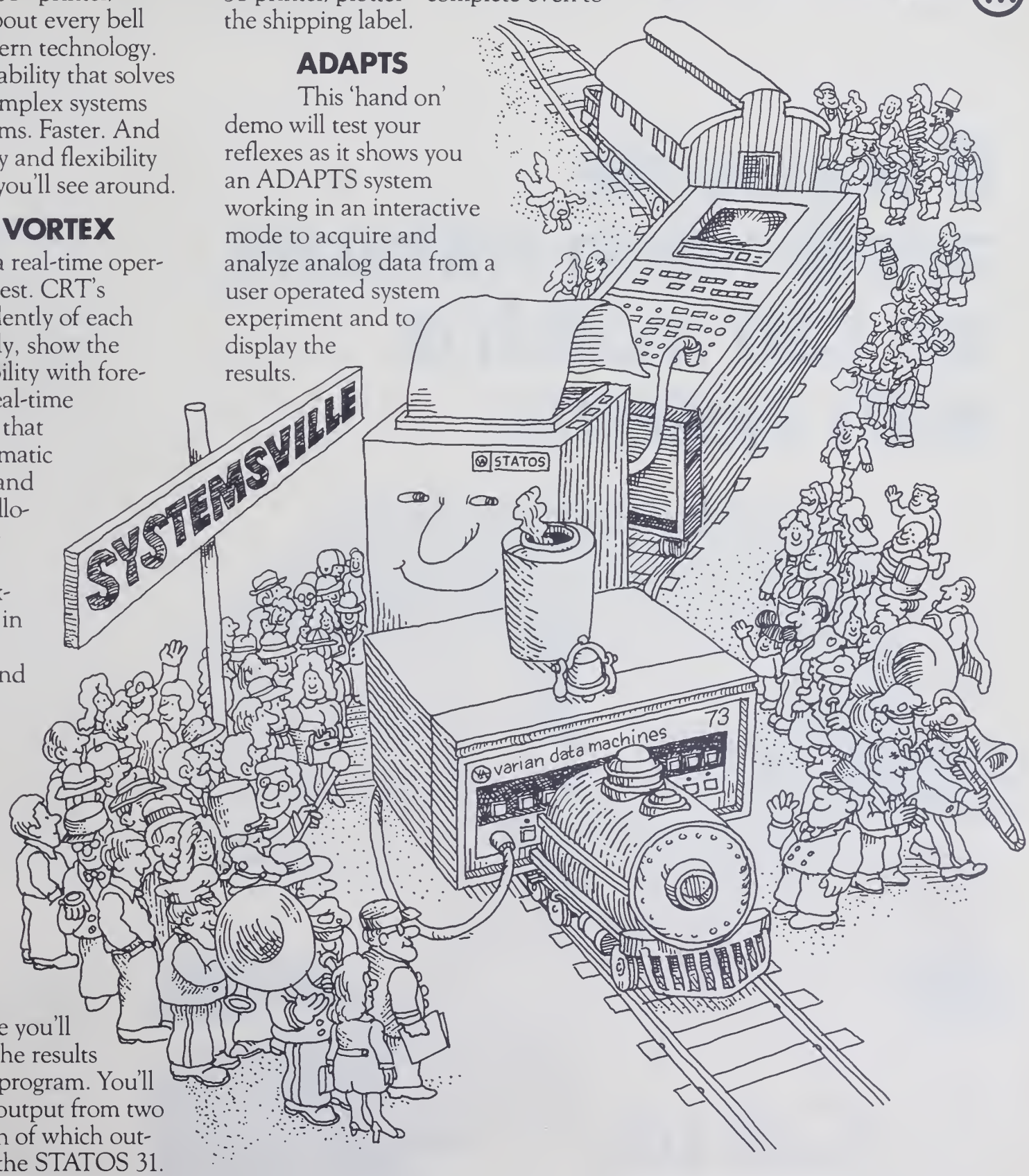
This 'hand on' demo will test your reflexes as it shows you an ADAPTS system working in an interactive mode to acquire and analyze analog data from a user operated system experiment and to display the results.

Bells, lights and buzzers will test your reflexes and stimulate your thinking about our systems capabilities.

Get into our system. Go to town with us.

Varian Data Machines,
2722 Michelson Drive, Irvine,
California 92664 (714) 833-2400

varian data machines



system for the user of less than ten keypunches. System 280 offers most of the features of the larger System 480, plus a unique communications option.

***

GENERAL COMPUTER SYSTEMS, INC.
P.O. Box 6251
Dallas, Texas 75222
Tel: (214) 242-8411

The GCS 2100 multimedia data entry system provides Interactive Data Editing At Source *(IDEAS®)*.

Featured with GCS 2100 will be turnaround document processing and work processing.

THREE YPES OF INPUT will be demonstrated: punched cards, the standard 029 keyboard for data entry, and the typewriter keyboard for word processing.

FOUR TYPES OF OUTPUT will also be operational: magnetic tape, teletype, sixty line per minute supervisor station, & high speed printer for letter writing.

The GCS 2100 with 29 million characters of data storage, provides CRT formatting with GCS's unique *PROMPTING®* for both data entry and word processing.

. . . the data editing company with *IDEAS®*.

***

HAZELTINE CORPORATION
Pulaski Road
Greenlawn, N.Y. 11740
Tel: (516) 549-8800

Hazeltine Corporation, Greelawn, New York, will exhibit the Hazeltine 2000 teletype compatible video display terminal, dual magnetic tape cassette unit and hard copy printer. The Hazeltine 2000 is used either as a stand alone remote terminal which can operate at variable speeds up to 9600 BPS, or as an off-line data entry device in conjunction with the magnetic tape cassette unit. Several editing features as well as dual intensity video for protected format display provide a powerful system for data preparation, entry and retrieval.

***

HEWLETT-PACKARD COMPANY
11000 Wolfe Road
Cupertino, Calif. 95014
Tel: (408) 257-7000

Hewlett-Packard's display includes the remarkable new HP-80 shirt-pocket calculator. Brother to the very successful, engineering-oriented HP-35 calculator, the HP-80 is designed to serve the needs of the business and financial community.

A demonstration of low-cost batch processing with HP's thoroughly modern mini is one of the features of the 2120 DOS-M system, while multiprogramming capability is documented in a variety of commercial, scientific and engineering appliations.

OEM product displays include the micro-programmable HP 2100 minicomputer, HP-7900 moving-head discs and 7970 digital magnetic tape units.

***

INCOTERM CORPORATION
6 Strathmore Road
Natick, Mass. 01760
Tel: (617) 655-6100

INCOTERM Corporation is displaying its new low-cost SPD 900 series Remote Batch Terminals. The series 900 offers compatibility with IBM 2780 and 3780, Univac 1004, CDC User 200, 360/20 HASP and ICL 7020.

The key element of the series 900 is the famous INCOTERM 10/20 Stored Program Display and electronic keyboard. Three models offer a choice of line printers from 200 to 400 lines per minute and card readers from 150 to 300 cards per minute.

***

INFOREX, INC.
21 North Avenue
Burlington, Mass. 01803
Tel: (617) 272-6470

INFOREX will exhibit its 1302 Intelligent Key Entry System and highlight its new KeyScan and In-Line Data Entry Systems. The 1302 Intelligent Key Entry System features all keypunch, key-verify, and key-to-tape functions as standard, plus many new key-to-disc capabilities in a system with proven performance and reliability. KeyScan, for the processing of turnaround documents and check remittances, offers a unique combination of OCR, Automatic Check Processing and operator keyboard intervention within an integrated system designed to reduce the number of steps and personnel, thereby lowering the cost per document processed. The new In-Line Data Entry System is designed to meet the users' specific data preparation needs by offering a wide array of editing checks assuring immediate error detection and correction. These range from simple table look-ups to field, record, document and group integrity tests.

***

INFOTRON SYSTEMS CORPORATION
7300 N. Crescent Blvd.
Pennsauken, N.J. 08110
Tel: (609) 665-3864

Infotron Systems Corporation will exhibit their latest time division multiplexer (TDM) and front end equipments, the Timeline 240 and Timeline 450.

The Timeline 240, an ultra reliable TDM, accomodates all available terminal types, codes and speeds – both asynchronous and synchronous – from 37.5 to 4800

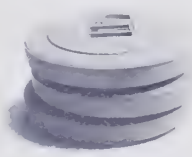
If you write application software, we can match it with systems.

Why stop at selling or leasing software systems to end users? Now you can offer them complete minicomputer package systems.

This way they'll be able to get everything they need from you. And you'll be able to get everything you need from us.

Wider choice of peripherals We offer a full line of peripherals to go with our SUE and MAC minicomputers: IBM compatible 5440 disks, CRT/keyboards, printers from 100 cps to 600 lpm, magnetic tapes, cassettes, punched card devices and paper tapes. Anything your customer needs. And when his needs change, so can the system. Easily. Even by factors of 2 or 3.

Complete software tools To make your programming burden lighter we offer a full set of software tools: Fortran, assemblers, utilities, RTOS, sort/merge, DOS and RPG/SUE. That last item is 98% compatible with RPG II by the way.



And we're the only company we know of that unconditionally warrants all our software for a full year.

Maintenance too We'll handle any and all problems your customers might have, promptly and expertly, anywhere. (We recently solved a problem in Bangkok, for instance.) And we'll do it by contract or on call, either way you want it.

We also offer training classes in maintenance as well as in programming.

Add it up So what you'll have is a more salable package to offer an end user. Everything he'll ever want or need in a minicomputer system, right down to the enclosures. (Which we'll put your name on, if you wish.)

Everything ready and working from the minute it's wheeled in his door.

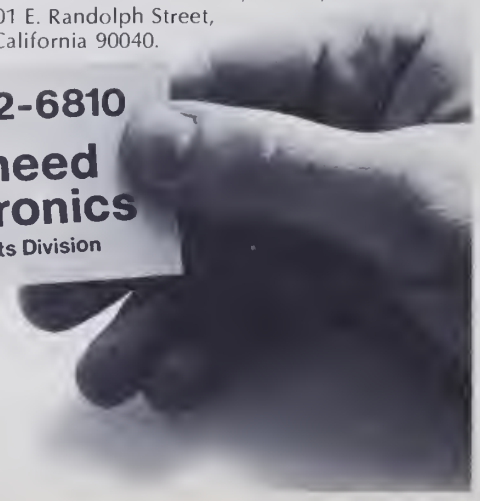
YOUR NAME

And you'll be dealing with an established, reputable company. One that will be there when you need us.

Let's talk. Call the number below, collect, or write us at 6201 E. Randolph Street, Los Angeles, California 90040.

213/722-6810

Lockheed Electronics
Data Products Division



Call us.

Boston 861-1880 • New York metro (201) 947-8107 • Philadelphia 825-2880
Washington (703) 525-3600 • Atlanta 266-0730 • Detroit 577-5037 • Chicago 833-4600
Dallas 231-6163 • Houston 682-2617 • San Francisco (408) 257-3357

baud. Features include critical component redundancy, full system diagnostics, automatic baud rate detection, dynamic overspeed protection.

The Timeline 450 Port Selector extends a computer's traffic handling capability. Front end ports are assigned to communications channels on a hynamic rather than dedicated basis, allowing fewer ports to service more lines. Maximum capacity is 254 lines by 124 ports.

***

INTERDATA, INC.
2 Crescent Place
Oceanport, N.J. 07757
Tel: (201) 229-4040

Interdata will display several members of its New Series of minicomputers. This upward compatible family of processors covers the complete range of the price/performance spectrum. Members of the family include: the Models 70, 74 and 80 for general purpose use and the Models 50 and 55 for Data Communications. Interdata will also display its full range of software Operating Systems: a Real Time Telecommunications Operating System, a Real Time Operating System, a Basic Operating System and a Disc Operating System. Each afternoon during the show, Interdata will present a meaningful seminar on either "Microprogramming," "Data Communications," or "Operating Systems Software."

***

INTERNATIONAL COMMUNICATIONS CORPORATION
A Milgo Company
7620 N.W. 36th Avenue
Miami, Fla. 33147
Tel: (305) 691-1220

ICC/MILGO will display a complete line of data communication products, featuring high-speed modems for data transmission over dial-up phone lines or leased data lines. Modems from ICC operate at data rates from 2400 bits-per-second to 9600 bits-per-second. The ICC display will also include data communication test equipment and accessories. Experienced personnel will be in attendance for consultation.

***

IOMEC INC.
Route 9
Southboro, Mass. 01772
Tel: (617) 481-2500

IOMEC, one of the largest independent OEM suppliers of minicomputer peripherals and data entry terminal equipment announces 13 new product additions at the 1973 Computer Caravan.

The new products include:

– Five brand new paper tape products – featuring the first 1000 cps reader for less than $1000 and the 70 cps punch/400 cps reader combination.

– An entirely new series of disc drives including new mass storage (36 megabits) add-on dsic memory for the Series One "floppy" disc system.

– Plus Model 200 multi-font buffer line printer; varied packages of the IOTAPE Series Three minicartridge deck and the Series Ten large tape transports.

– One of the most advanced portable data entry equipment systems in the market today. The system uses micro-logic circuits to provide an extensive range of features at the lowest price.

***

ITT DATA EQUIPMENT & SYSTEMS DIVISION
East Union Avenue
East Rutherford, N.J. 07073
Tel: (201) 935-3900

The ITT 3501 Asciscope is a low-cost, TTY compatible CRT display terminal complete with keyboard, acoustic coupler, integral modem, buffer, and printer interface – no extra costs. The Asciscope can communicate terminal-to-computer or terminal-to-terminal. It features interfaces for a Data Access Arrangement when using its integral 300 bps modem, for external modems of 1200 or 2400 bits per second, and for printers operating up to 120 characters per second. The Asciscope leases for $65.00 a month, including maintenance. Nationwide installation and service by ITT includes on-the-spot exchange if a leased unit should ever require service.

***

LOCKHEED ELECTRONICS COMPANY, INC.
Data Products Division
6201 E. Randolph St.
Los Angeles, Calif. 90040
Tel: (213) 722-6810

The SUE minicomputer data processing system for small business applications will be demonstrated by the Data Products Division. System flexibility provides for memory expansion to 64K bytes, up to four 5440 type disk drives, high performance printers, magnetic tape, and card equipment. Comparable to IBM System 3/model 6, the CRT oriented SUE system is of particular interest to application software organizations who wish to market a turnkey total package for small business applications. Manufacturer supplied software includes RPG II, a disk operating system, and sort/merge, as well as assemblers and utilities.

Also displayed are memory modules of the MM-365, a replacement memory for the IBM 360 model 65 and up.

***

Penril is not the largest manufacturer of high speed modems in the world.

But we will be.

Penril
Data Communications, Inc.
5520 Randolph Road
Rockville, Maryland 20852
301/881-8151

Regional offices:
Atlanta, Boston, Chicago, Houston, Los Angeles and New York

Penril's 4800B-1 modem pictured above has been selected by the U.S. Internal Revenue Service for use in its nationwide data communications network.

MODULAR COMPUTER SYSTEMS, INC.
1650 West McNab Road
Ft. Lauderdale, Fla. 33309
Tel: (305) 974-1380

The MODCOMP MAX III real-time multiprogramming operating system will be demonstrated. Foreground tasks will be initiated and executed. Assemblies and FORTRAN compilations will be performed as background operations. A MODCOMP II/25 computer with 32K words of 16-bit, 800 nanosecond memory will be used for the demonstrations. System peripherals will consist of disc, card reader, two CRT's, paper tape reader, and keyboard/printer. Analog, digital and communications interfaces will also be displayed.

While at the MODCOMP booth, guests may register to win a MODCOMP II computer with 16K words of memory. This computer will be awarded at the end of the Caravan's ten-city tour.

***

PARADYNE CORPORATION
8550 Ulmerton Road
Largo, Fla.
Tel: (301) 654-0033

Paradyne Corporation will display: The BISYNC-48 super modem featuring the highest throughput available on dial-up lines – plus, guaranteed error-free transmission; our 4800 bps, automatically-equalized M-48 modem with really usable self-test features; the BISYNC Analyzer – the unique test instrument that provides immediate fault isolation in BSC communications links; and the revolutionary remote I/O and computing systems that eliminates conventional communications hardware, terminals, modems and software – Paradyne's astonishing PIX.

Sales and Services offices in Largo, Florida (headquarters); and San Francisco; Los Angeles; Atlanta; Chicago; Boston; Detroit; St. Louis; New York City; and San Antonio.

***

PENRIL DATA COMMUNICATIONS, INC.
5520 Randolph Road
Rockville, Md. 20852
Tel: (301) 881-8151

A complete line of data modems operating from 300 bps to 4800 bps for leased line and DDD data transmission. End user, OEM and custom designed configurations will be displayed. Also, specially designed telephone line test and analyzing equipment will be demonstrated.

PER DATA CORPORATION
102 New South Road
Hicksville, N.Y. 11801
Tel: (516) 938-2851

Digital Tape Transport –
7 or 9 track; read after right or read only, 25 to 75 IPS. 200, 556, 800 & 1600 CPI densities. IBM compatible. Fixed head disk drive fast head per track random access storage. Storage capacities up to 1 million 16 bit words. Average access time - 8.5 ms. Non-contact head loading.

Moving Head Disk Drive – Front load or top load. Storage capacity up to 100 million bits at density of 200 track. Access time – 38 ms.

Controllers & Formatters – for tape transport, moving head disk, fixed head disk and printer. Fully self contained including power supply and cabling.

***

Vermont Research

FIRST IN MEMORIES

Whether it is disc or drum — whether it is head per track or moving head — whether it is digital interface or complete memory system, you should call us at Vermont Research to review your requirements for rotating memories

Head Per Track
Drums
Series 3000

The best in performance and reliability. The standard for head per track memories is set by Vermont Research.
2200 bits per inch
8.7ms average access
4 megacycle data rate and a range of products to choose from

Moving Head
Disks
Series 5000

A moving head memory with a conservative Vermont Research specification. Surely the standard of moving head devices.
400 tracks per inch
4000 bits per inch
35ms average access
6 megacycle data rate
40 megabyte capacity and a range of products to choose from

Vermont Research Corporation
Precision Park
North Springfield
Vermont 05150
Telephone: 802-886-2256
Telex: 710-363-6533

VRC Inc.
5261 West Imperial Hwy
Los Angeles
California 90045
Telephone: 213-641-7100

Vermont Research Limited
Cleeve Road
Leatherhead
Surrey
Tel: Leatherhead 74758
Telex: 23280

PRIME COMPUTER, INC.
17 Strathmore Road
Natick, Mass. 01760
Tel: (617) 655-6999

The Computer Caravan is PRIME Computer's first major public demonstration of its recently announced PRIME 200 small computer. Featuring a unique (software first) design – all systems software was completely specified before the computer's hardware was designed – the system will be used to demonstrate an extremely powerful disc operating system. PRIME's DOS-200 features extensive file management resources, batch processing system, numerous disc file access discipline, and file system common to all PRIME software.

***

SANDERS DATA SYSTEMS
Daniel Webster Highway
Nashua, N.H. 03068
Tel: (603) 885-4211

Sanders to feature intelligent terminal system with disk during Caravan.

Sanders Data Systems, Inc. will exhibit and demonstrate both their 804 stand alone and 810 cluster display terminal systems using standard software packages for order processing, billing, inventory control, data entry, remote job entry, and other business applications during the Computer Caravan.

The 810 system features a disk memory which can provide up to 5 million bytes of storage, while the 804 system interfaces a tape cassette transport for applications needing smaller storage capabilities. Both systems will be seen in operation with 32 character per second and 200 line per minute printers, and a card reader.

***

SIERRA RESEARCH CORPORATION
47 Middlesex Tpke.
Burlington, Mass. 01803
Tel: (617) 273-0900

It's time your computer got its hands dirty. Sierra Research Data Systems Division will demonstrate the capabilities of the SDA-770 Data Collection System to collect, inquire, retrieve and display manufacturing data. Typical inventory, material flow and labor distribution control programs will be demonstrated with the Sierra Operating System and FDC (Factory Data Collection) programs. Remote data collection will be demonstrated twice daily via on-line communications between a real-time SDA-701 Remote Terminal and SDA-710 Attendance Station at the Computer Caravan and a Sierra SDA-770 Central Controller at our plant in Boston, Massachusetts.

***

SYCOR, INC.
100 Phoenix Drive
Ann Arbor, Mich. 48104
Tel' (313) 971-0900

Sycor will exhibit its popular Model 340 Intelligent Communications Terminal in two configurations – branch office order entry and remote job entry. The branch office terminal will demonstrate Sycor's unique dual communications feature – low speed (110-300 baud) asynchronous communications compatible with major time sharing systems and high speed (1200-4800 baud) binary synchronous communications. The remote job entry configuration features a 200 lpm printer, a 250 cpm card reader, and is compatible with computers operating under HASP or ASP control. Both configurations are user programmable with Sycor's T.A.L. (Terminal Applications Language).

***

SYSTEMS ENGINEERING LABORATORIES, INC.
6901 West Sunrise Blvd.
Ft. Lauderdale, Fla. 33313
Tel: (305) 587-2900, ext. 544

Systems Engineering Laboratories will display the power and versatility of their SYSTEMS 72 computer. It will be running FORTRAN, BASIC and Batch at the same time it is shooting craps with booth visitors.

- SYSTEMS 72, the first small, virtual-memory computer, combines the advanced problem-solving capabilities of much larger computers with the easy operation and economy of minicomputers.

It features: time-sharing - virtual memory - reentrant FORTRAN/BASIC - multiprogramming - all processors available to users console simultaneously.

- SYSTEMS will also show a film on EDITS (Engineering Documentation Interactive Terminal System), a new system for faster, more economical preparation of engineering drawings.

***

TALLY CORPORATION
8301 South 180th Street
Kent, Washington 98031
Tel: (206) 251-5500

Tally Corporation will feature the Datascribe – the total data entry, communication print out system plus the new Tally line printer – the most cost effective choice for intermediate speed printing applications.

The Datascribe Communicator with its unique data compression feature eliminates transmittal of redundant information which reduces telephone line time up to two-thirds. Transmission speeds range from 80 to 420 records-minute depending on the modem used and the amount of data compression available.

Data on magnetic tape can be printed at up to 200 lines per minute on the new Tally printer. The patterned CROSS-POINT® printing technique results in unpresidented reliability and consistent high quality multiple copy at low cost per page.

TECHTRAN INDUSTRIES, INC.
580 Jefferson Road
Rochester, N.Y. 14623
Tel: (716) 271-7953

Cássette Communications Terminals, EIA RS232 and TTY Compatible featuring single and dual decks, switch selectable speeds to 2400 baud, High Speed Search, FULL Remote Control, Data Edit, Switch Selectable On-line/Off-line operation; models for both ASCII and IBM 2741 operations.

***

TEKTRONIX, INC.
P. O. Box 500
Beaverton, Ore. 97005
Tel: (503) 644-0161

Tektronix shows new APL graphic terminal.

The 4013, Tektronix's new APL terminal will be shown at the Computer Caravan. The company will also show the 4912 Digital Cassette Tape Unit and 4610 Hard Copy Unit. APL provides an extremely flexible language for computer graphics. Tektronix has implemented a group of functions to exploit the advantages of APL as a programming language for graphics.

The 4013 is a member of the 4010 family of computer display terminals. Pricing and delivery information is available at the booth.

***

TELETYPE CORPORATION
5555 Touhy Avenue
Skokie, Ill. 60076
Tel: (312) 982-3134

Teletype Corporation is exhibiting their model 38 wide platen terminal

When you visit

the MODCOMP exhibit, you can register to win a MODCOMP II computer with 16K words of 800 nanosecond memory. Contest rules and entry blanks are available at the MODCOMP booth.

While visiting us, you will see a MODCOMP II system with disc, CRT's and other peripherals operating under our MAX III Real-Time Executive. Real-time tasks will be scheduled, initiated and executed while FORTRAN compilations and assemblies are performed at a checkpointable, lower priority level in the background.

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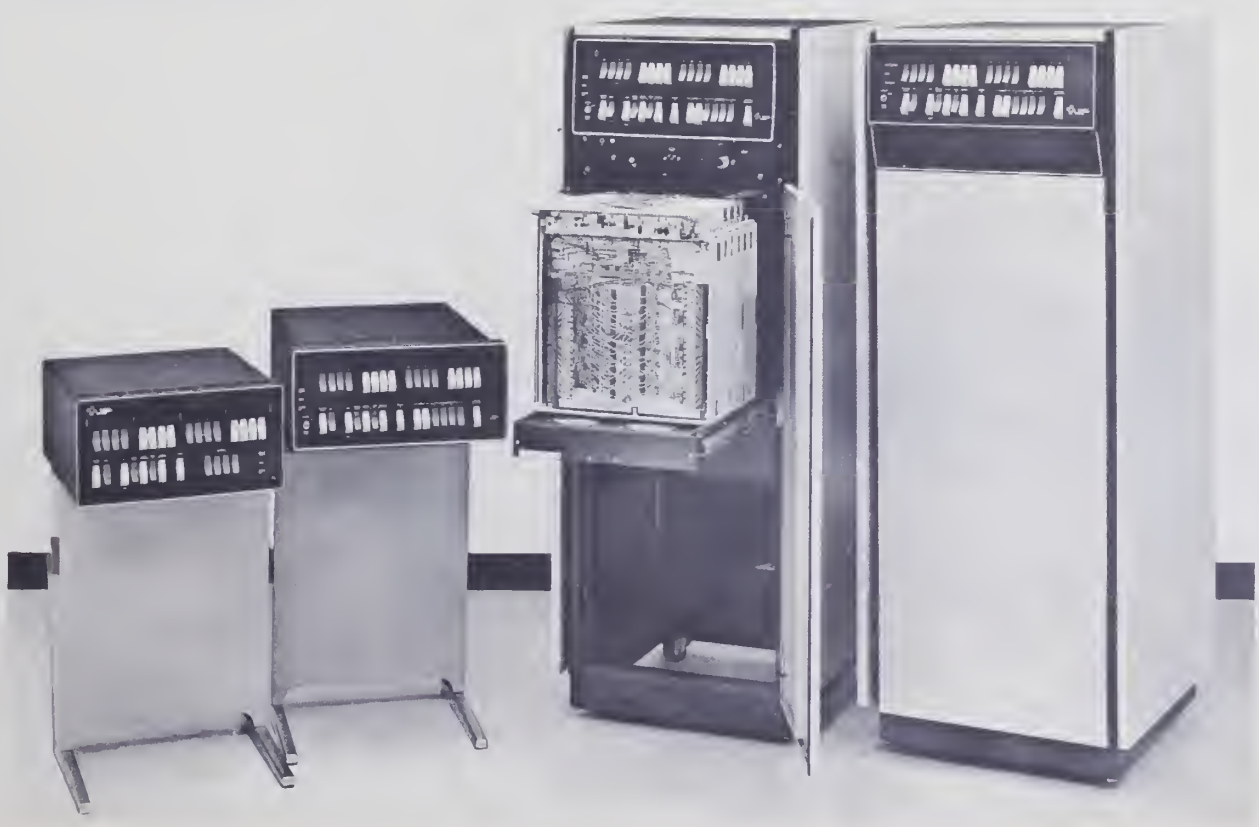

and the Teletype® 4210 magnetic tape data terminal featuring the automatic rewind and local printout option. When combined as a remote-computing terminal arrangement, you transmit and receive online at speeds up to 240 characters per second, and then print out data at lower local speeds, all on an unattended basis. The model 38 terminal prints a full 132 character line at 10 characters per inch in upper and lower case, and accepts standard 14-7/8" fan-fold paper. Total price for both terminals is less than $4,000.

***

TEXAS INSTRUMENTS INC.
P. O. Box 1444
Houston, Texas 77001
Tel: (713) 494-5115, Ext. 2165

"Silent 700*" Electronic Data Terminals and minicomputers will be demonstrated and displayed by TI personnel. The new, low-cost "Silent 700" ASR teletypewriter with twin magnetic tape cassettes will be demonstrated, as will the popular Model 725 Portable Data Terminal. Two 16-bit minicomputers will be on display; the Model 960A "Bit-Pusher*" computer, and the Model 980A high-performance general purpose computer. Both computers have fast semiconductor memory and many standard and built-in features for more cost-effective computer applications.

*Trademarks of Texas Instruments Inc.

***

VARIAN DATA MACHINES
2722 Michelson Drive
Irvine, Calif. 92664
Tel: (714) 833-2400

Varian Data Machines demonstrates broad systems capability along with some new products. ADAPTS, Varian's laboratory automation system built around Extended BASIC, will be demonstrated on a 620/L-100 computer. Also on display are VDM's new V73 medium-scale computer and the STATOS 31 electrostatic printer/plotter. These items along with other peripherals, are tied together in one system under control of the VORTEX real-time operating system software. Both laboratory and business-oriented applications will be demonstrated.

***

VERMONT RESEARCH CORPORATION
Precision Park
S. Springfield, Vt. 05150
Tel: (802) 886-2256

The Model 5016 Disk Memory provides 40 megabytes of data storage on one fixed disk, and one removable disk in a top loading 5440 type cartridge (with a 3336 type disk). Technology breakthroughs in proprietary track following and magnetic head design allow conservative track densities of 666 tracks per inch with equally conservative track bit densities of 4100 bits per inch nominal. Access time for this advanced moving head disk is 28 msec average, 60 msec maximum. 3600 RPM operation provides a low 8.33 msec average rotational latency and a fast 6.9 megabit serial data rate. The slide and mounted unit includes an integral DC power supply in its 10 3/8 inches of 19-inch RETMA rack. Also available with the micro-programmed, error-correcting Model 8100 "Intelligent" controller which can serve up to eight disk units.

The Model 3002 Drum Memory is the newest of VRC's dependable head-per-track drums. Data capacity is 9 megabits on 128 tracks. Reliable TBM data recording at 2200 bits per inch allows 4096 16-bit words per track formatted in 128 sectors. 3600 RPM operation gives you true 8.7 average access. A dust-tight enclosure and an automatic head actuation mechanism continue the proven VRC reliability. Mounting slides, DC power systems and distinctive front panel are standard. So is the single connector TTL interface. Available with either the Model 3100 sector-buffered controller or the Model 3400 two-word buffer controller. The Model 3008 is a big brother with up to four times the data capacity.

***

WESTERN UNION DATA SERVICES COMPANY
16 McKee Drive
Mahwah, N.J. 07430
Tel: (201) 529-1170

Western Union Data Services Company will show side by side the 30 character-per-second EDT 300 AST Teleprinter with its paper tape buffer and its EDT 300 Magnetic Send-Receive, a terminal with integrated magnetic tape buffering capability for remote batch and time-share applications.

***

DATA GENERAL CORP.
Route 9
Southboro, Mass. 01772
Tel: (617) 485-9100

Data General Corporation, the number two minicomputer manufacturer in the world, will display its minicomputers, peripherals, and software. A system built around a powerful Nova 800 Jumbo will demonstrate a Real-Time Disc Operating System, Timesharing BASIC, and the new Fortran 5 on a variety of terminal devices. Data General's minicomputers are used for all types of applications, including computation, communications and control/instrumentation.

See how Paradyne can help turn your data communications links into assets instead of liabilities. You can't afford to miss seeing these five proven time and money savers when Computer Caravan '73 comes to your city!

1. The BISYNC-48 super modem featuring the highest throughput available on dial-up lines — plus, guaranteed error- free transmission.
2. Our 4800 bps, automatically equalized M-48 modem with really useable self-test features.
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Discover for yourself how Paradyne products and service maximize performance and reliability of your data links within a cost/benefit context that makes good business sense.

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Just in case you happen to miss us at the Caravan, contact your local Paradyne office for complete details:

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512/734-5179

paradyne

Paradyne Corporation 8550 Ulmerton Road Largo, Florida 33540 813/536-4771

Bits & Pieces

CDC Unveils Plug-to-Plug Replacement for IBM 3330s

MINNEAPOLIS – Control Data Corp. has announced the CDC 33301 Multiple Disk Memory System – a plug-interchangeable replacement for the IBM 3330 Disk Subsystem.

Designed for use with the IBM 370 Series computers and with Model 85 and larger units within the 360 Series, the 33301 replaces the IBM 3830/3330 Disk Storage Facility.

The CDC subsystem attaches to the IBM mainframe's block multiplexer channel, and uses either CDC 879 or IBM 3336 disk packs.

The CDC system provides 100M to 800M bytes of high-speed, random-access, on-line storage through the use of a control unit and one to eight disk storage units.

A Control Data 38301 System Controller with from one to eight drives leases for $2,650 to $5,650/mo on a one-year lease with full maintenance included.

Purchase price of these systems ranges from $106,000 to $238,000 without maintenance, for first delivery in June 1973.

Across the entire line, these prices average about 20% lower than IBM prices for comparable subsystems, a CDC spokesman said.

Speeding Up the D-116 Mini

FAIRFIELD, N.J. – Digital Computer Controls, Inc. has a faster version of its D-116 minicomputer.

The D-116H has a full cycle time of 960 nsec – 20% faster than the standard D-116 – and has a storage capacity of 32K 16-bit words of core memory.

Prices for the D-116H begin at $4,000 with 4K memory, central processor, programmer console and external I/O connector, from 12 Industrial Road, 07006.

Optical Reader 'Similar' to Copier

PARAMUS, N.J. – Creative Logic Corp. has introduced the Laser Vision Series 3200 Optical Page Reader.

The LV-3200, which uses a laser beam, prism system and a type-written font, can read speeds above 3200 char./sec.

Similar in operation and size to a free-standing office copying machine, the vacuum transport accepts paper sizes from 3 in. by 5 in. up to 9 in. by 11 in. A standard 8-1/2 in. by 11 in. page can be transported, read and processed in six seconds.

Output devices for the unit include 7- or 9-track computer-compatible magnetic tape, punched cards, punched paper tape and medium- or high-speed communication lines.

Priced at approximately $12,000 (scanner only), the LV-3200 is available from 80 E. Ridgewood Ave., 07652.

Testing--Part II

Disk Performance Improved by 5 Tests

By Alan M. Stoughton
and
Dr. John C. Scott
Special to Computerworld

An understanding of the causes of potential disk errors enables the user to respond more intelligently when troubles arise.

Many errors in writing data onto or reading data from magnetic disks result from protrusions or scratches on the disk's magnetic coating.

After the aluminum substrates have been tested, they are coated (or plated) with a thin film of magnetic material to give the disk its information storage capability.

The process is subject to aggregation of the oxide particles and formation of bubbles in the coating as it is setting. The possibility of nonuniformity of coating in the application process also arises.

A finished disk may contain microscopic surface protrusions which can interfere with the ability of the recording head to fly.

To minimize this risk, prior to sale the disk is spun at a speed less than its intended operating speed with a special burnishing head over the surface, at about one half the height of the normal read/write heads.

After burnishing, the height of any surface defects has been reduced to one-half the flying height of standard heads – enough to prevent damage to the read/write heads, but not enough to prevent data errors.

The disk after burnishing is ready for testing of magnetic recording performance.

Five of the more common tests are: extra bit; missing bit; amplitude modulation; resolution; and overwrite modulation.

When a constant dc write current is passed through the coils of the head, a uniform flux is generated. If the magnetic medium of the disk has been laid down uniformly, the medium will be magnetized uniformly in one direction.

Disks: Nothing But the Truth

On reading back there will be no induced voltage through the head, since the head only senses changes in flux.

However, where the coating has not been laid down uniformly and regions of differing magnetization exist, the read-back induces signals. The size and width of these extra pulses are directly related to the dimensions of the magnetic defects.

Where voids, scratches and pinholes occur in the magnetic medium, there will be a flux change.

At the edges of any such hole, it is possible that extra bits exist. If the hole is large, the signal amplitude of any magnetic transition scheduled for that region of the disk is zero and the information is lost.

If the hole is small, the signal may fall to x% of its expected amplitude. If x is less than the accepted limit of the read circuitry, then again the information is lost.

This phenomenon is the basis of the missing bit test. Any pulse less than x% is noted as a missing pulse with the value of x selected on the basis of performance specification and yield criteria.

Amplitude Modulation Test

As recorded data goes through the various permutations of the encoding method (e.g., 1 to 0 to 1 to 0 to 1), the amplitude of the read-back signal varies locally because of the differing separation between the magnetic transitions.

Coating uniformity is controlled by performing a modulation test on the playback signal. The signal is passed through low-level filters, and the level of modulation about a mean value is measured.

Resolution Test

Flux changes in a magnetic head cause corresponding flux changes in the magnetic medium passed under the head. The transitional region between is ideally shown as a line.

In reality, it has a finite width, dependent on the amplitude and phase of the applied head field, the magnetic medium formulation and thickness, and the writing frequency.

As the head moves over the disk, the ratio between amplitudes read back from signals written at frequency 1F and those written at 2F will vary.

If this ratio variation becomes excessive, undue peak shift occurs and information is improperly decoded. Consequently it is important to measure this ratio with a known head.

Overwrite Modulation Test

The transition region between data cells is a zone of unsaturated magnetization bounded by two regions of saturated magnetization.

Since the transition regions are differing widths for 1F and 2F, when a 1F signal is overwritten by a 2F signal, it is possible that some of the unsaturated regions for both frequencies coincide.

In this situation the overwritten signal does not completely obliterate the information beneath it.

The effect for a particular read/disk combination can be measured by observing the modulation of a 1F signal which has been overwritten with a 2F signal.

These fives tests combined with a measurement of the average amplitude for each test track result in a complete quantitative and qualitative analysis of a disk surface.

Alan Stoughton and Dr. John Scott are employees of Computest in Cherry Hill, N.J.

PDP-11 Users Reap 2 Offerings– Interface Kit and 16K-Bit ROMs

By a CW Staff Writer

In two separate offerings, PDP-11 users can use a do-it-yourself kit from DEC to attach non-DEC-supplied peripherals and can add 16K-bit read-only memories from Integrated Memories Inc.

The do-it-yourself interface kit allows non-DEC peripherals, production control units and laboratory control instruments to be plugged directly to the processor via the Unibus.

Each of the three kits includes a prewired backplane unit that accommodates from six to 18 standard logic modules which are configured by the user for his particular application, a spokesman said.

The Deckit11-H package can read four 16-bit data words from a peripheral device into any PDP-11 processor, and write four 16-bit words or eight 8-bit bytes to a peripheral device. It is priced from $1,165 (exclusive of cabling and Unibus connectors).

The Deckit11-F reads three 16-bit words while writing one word. It is priced from $750 (exclusive of cabling and Unibus connectors).

The Deckit11-K is designed for reading eight 16-bit words from a peripheral with no words written and is priced from $695 (exclusive of cabling and Unibus connectors).

Add-On ROM

The field-alterable Capacitive Read-Only Memory (Crom) System Model 1002G from Integrated Memories is pin-to-pin compatible with the DEC PDP-11. The basic system can also be interfaced and packaged for other minicomputers, the firm said.

The system on a pc board costs about $600 per unit. The full 256 x 16 Crom system uses one card slot in the PDP-11. Larger capacity systems with up to 16,000 bits could be accommodated on the same pc board, the firm noted.

The system has a MTBF calculated at greater than 200,000 hours. The firm is at 260 Fordham Road, Wilmington, Mass. 01887.

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Unbeatable price/performance ratio! At $1995, the Model 306 is the fastest, low cost 80-column impact printer you can buy.
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western region: (714) 979-6650 (calif.)

Here's just some of what's happening at the 1973 Computer Users' Forums.

And it'll be happening soon in a city near you:

The Computer Caravan/73 is on its way. And the Users and Panelists attending Forums in the beginning of our tour have exchanged a wealth of information on a wide range of topics. Information you can't get in books. Experience-based information from the people who've been through it. User talking to user in shirtsleeve workshops, panel discussions and seminars. It's a unique exchange of information that will benefit you and your company.

FORUM TOPICS

Day 1 – Data Entry – Including keypunch replacement (shared Processor), Intelligent Terminals, OCR, and Direct (on-line) Data Entry.

Day 2 – Communications – Including Data Transmission (dial-up and leased lines/broadband) and Equipment Selection (communications processors and control equipment).

Day 3 – Installation Management – Including Personnel recruitment and training, Programming management and independent peripherals (including memories).

OPEN SESSIONS

Each afternoon features a new, open session for all those who wish to attend. A different subject will be opened up each day at 2:30 for discussion and controversy.

Day 1 – Data Communications Planning
Day 2 – Software Evaluation Panel
Day 3 – Small Systems Panel

PANELISTS

Next stop: Houston. And here are some of the panelists who will be there: Gerry Hammer, Getty Oil; Robert Balough, J. Weingarten; C.M. Metcalf, Bank of the Southwest; Phil Rossiter, Texas Commerce Bank; Joe Hopkins, Gulf State Utilities.

Send in your reservation form now, and your space at the 1973 Computer Users' Forums will be reserved.

The Computer Caravan/73

sponsored by

COMPUTERWORLD

Computer Users' Forum Registration

Name_____

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1. Please circle one number in each category.

(This information is necessary to provide a better forum for you.)

YOUR INDUSTRY

01 Mining/Construction/Oil & Refin.
02 Manufacturing – Computer or data system hardware, peripherals/ other associated mechanical devices
03 Manufacturing (other)
04 Utilities/Comm. Sys./Transport.
05 Wholesale/Retail
06 Finance/Insurance/Real Estate
07 DP Serv. Bureaus/Software/Plann.
08 Business Services (except DP)
09 Education/Medical/Legal
10 Federal, State and Local Govt.
12 Communications/Printing/Publ.
13 Other: ___

YOUR FUNCTION

01 Corporate Officer
02 Data Processing & Other Operational Management
03 Data Processing Professional Staff
04 Consultant
05 Lawyer/Accountant
06 Engineering – Mgmt./Scientific/R&D
07 Sales/Marketing/Account Exec.
08 Librarian/Educator
09 Other: ___

2. Please check the appropriate city:

__ Atlanta	March 13-15 (Tues, Wed, Thur)	Regency-Hyatt House
__ Houston	March 20-22 (Tues, Wed, Thur)	Hyatt-Regency Houston
__ Anaheim	March 27-29 (Tues, Wed, Thur)	Disneyland Hotel
__ San Francisco	April 3-5 (Tues, Wed, Thur)	Civic Auditorium (Forums & Exposition) Del Webb Towne House (Hotel Rooms)
__ Kansas City, Mo.	April 11-13 (Wed, Thur, Fri)	Municipal Auditorium (Forums & Exposition) Muehlebach (Hotel Rooms)
__ Chicago	April 17-19 (Tues, Wed, Thur)	Conrad Hilton Hotel
__ Cleveland	April 24-26 (Tues, Wed, Thur)	Convention Center (Forums & Exposition) Sheraton Cleveland (Hotel Rooms)

3. Check the day(s) you will attend the Forums.

☐ Day 1 – Data Entry – 9 am-2:30 pm
☐ Day 2 – Data Communications – 9 am-2:30 pm
☐ Day 3 – Installation Management – 9 am-2:30 pm
NOTE: Afternoon Sessions are open to all – free of charge.

4. Your enclosed check will cover all workshop materials, luncheon, Forum admission and admission to the Exposition Hall (make checks payable to "The Computer Caravan")

☐ One Day – $25.00 ☐ Two Days – $50.00
☐ Three Days – $75.00

All Tickets will be held in your name at the door

Exposition only tickets (no forums or luncheon) are $5.00 and should be purchased at the door (ticket good for all three days).

Return this form to:

Frani Blackler
Computer Users' Forum
797 Washington Street
Newton, Mass. 02160

For additional registrations, copy this form – or write for extra copies.

IBM Opts for Temporary Power System Backup for Data Processing Division

WHITE PLAINS, N.Y. – In choosing a backup power system for its internal Data Processing Division, IBM opted to install a temporary power system.

The system is designed to allow an orderly shutdown through the use of batteries as opposed to attempting to keep the system going for a prolonged period of time with backup power supplied by generators, according to a spokesman for C&D Batteries.

IBM's prime consideration, according to the spokesman, is the protection of a data base that receives an average of 600,000

The Problems of Power

inquiries daily from about 350 IBM locations – including branch offices, manufacturing plants and education centers – nationwide.

The need to protect this data base from damage through transient disturbances and short-term power outages led the firm to install a battery-powered UPS system that could handle problems up to 30 minutes in duration.

In the event of changing requirements, however, space provisions were made for possible installation of generators in the facility, the spokesman added.

Batteries Fill Gap

The current system, designed by GE in conjunction with IBM engineers, is shown in Chart 1.

Rating	1,250 kVA at 0.8 pF for approximately 30 minutes
Components	3 – rectifiers – 500 kW Input – 480 V – ac – 750A 3ph 60Hz Output – 390 V – dc – 1,280 A
	6 – solid-state inverters – 250 kVA Input – 320 to 420 V – dc Output – 208 – 120 V – ac – 690 A
	Battery banks 177 cells in bank – 3 banks – 531 total 2.2 to 2.25 V/cell (nominal) 1.8 to 2.20 V/cell (operating range) 1,950 A hr – 8-hr capacity

Chart 1. IBM's Uninterruptible Power Supply (UPS) System

Also considered in the installation of a battery-type system is protection against transient disturbances to equipment, the spokesman said.

With the UPS system, transient disturbances are eliminated since even minor power interruptions are avoided by means of the batteries filling the power gap, he asserted.

The GE UPS system was installed in 1970, when the computer center in White Plains was completed. Data processing equipment supported by the backup power system is found in Chart 2.

2 System/360 Model 85s
4 System/360 Model 65s
1 System/360 Model 30
58 2314 disk storage units
17 2841/2303 drum storage units
110 tape drives
20 printers
25 communications control units
40 modems and data sets

Chart 2. Equipment Supported by Battery UPS System at IBM's Data Processing Division

Monitors Detect Disturbances

MENLO PARK, Calif. – Three portable power-line disturbance monitors that simultaneously detect, count, categorize, time and record overvoltages, fast transients and frequency variations on single or 3-phase power lines have been introduced by Programmed Power Inc.

The 3200 Series provides audio/visual alarms and hard-copy printout indicating day, hour and minute, plus a code digit correlating to the specific power anomaly noted, the firm's spokesman said.

The visual alarm (front panel lights) is provided for under/over frequency, overvoltage and undervoltage registers.

The appropriate visual alarm is activated when a disturbance exceeds a preset limit with an audio alarm activated at the same time.

A 3-phase switch permits users to select phases for visual metering of voltage.

Power consumption ranges from 30 to 40W for the three units available.

Optional features include external alarm voltage terminals, BCD output terminals, 440 Vac modification and a 400 Hz, 3-phase modification, he added.

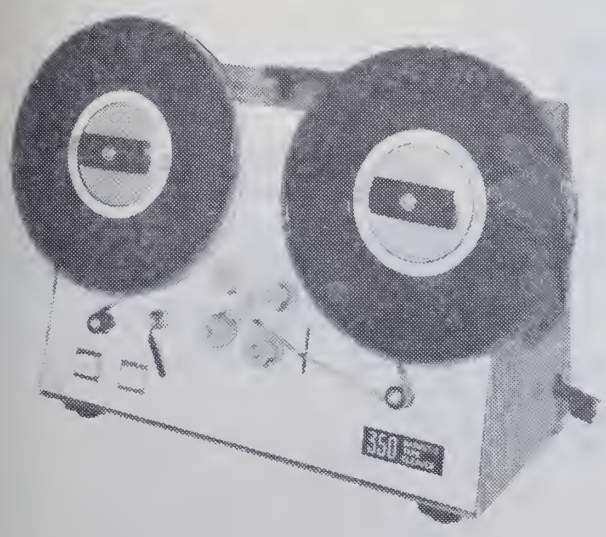
Prices for the three units range from $2,995 to $3,600 from 141 Jefferson Drive, 94025.

Quantor COMmon Sense in Bank Storage

Bankers find deposits in Quantor COM cut storage costs withdrawals.

Quantor

520 Logue Avenue, Mountain View, California 94040 (415) 965-3700; Oak Brook (Chicago) (312) 654-3720. New York, N Y (212) 279-3280. Washington, D C (703) 960-3707 Los Angeles, Calif. (714) 833-0157. Miami, Fla (305) 448-3650. Atlanta, Ga (404) 237-1176



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A family of low-speed modems for the user or OEM. Here are eight models . . . many others to choose from.

Model 150A—Acoustic coupler for TTY only $147

Model 150P—Built-in acoustic coupler for Series 33 Teletype..... $175

Model 302A—Acoustic coupler TTY and EIA interfaces. $245

Model 302D—replacement for 103A. Automatic answering with CBS or CBT DAA. TTY motor starter, initiate & respond to long space disconnect and 10 minute actlvity disconnect $325

Model 302F—replacement for 103F. Private line and 1000A, CDT DAA applications $245

Model 310—PC modem for OEM. Originate, acoustic/DAA, carrier detect, 4½ x 5½ x ½ "... $125

Model 320—PC modem for OEM. Answer/originate, acoustic/DAA, carrier detect, integral power supply. 4½ x 10½ x ¾ " $165

Series 330—Replacement for 103A, 103F, 103E, 113A and 113B. Automatic answering with CBS or CBT DAA. 16 modems in a 19" rack. Colored display panel indicates 4 controls and 2 data functions.

Auto answer modem $170

Private line modem $150

Complete cabinet, display and 16 Modems $3,185 or $73.00/month. (5-year lease with purchase option)

Also a complete line of other data communication equipment including frequency division multiplexers, data channel expanders, data channel concentrators, Teletype terminals, etc. Write for specs today.

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Datapoint delivers at Day's, Inc.

Day's, Inc., is a national leader in the explosive field of double knit men's slacks and jackets. In the fast moving fashion field, there's a real need for data *fast* to keep up with and ahead of sudden sales trends. Like other companies in the field, Day's has had the problem of moving data swiftly and economically between central offices and field facilities, and formatting this data so as to extract maximum benefit from it. Their answer: Datapoint 2200 systems are used in a number of departments at Day's to expedite transmission of source data to the company's central computing system and at the same time provide significant on site computer power at remote sites. The full programability of the 2200 plus the DATABUS processing language and other software aids supplied with the system make it easily adaptable to complex and changing application requirements.

Two Datapoint systems with attached tape units constitute an on-line link between the company's central computer operation in Tacoma and its warehouse in Clearfield, Utah. All incoming sales orders are funnelled through the central computer, matched against available inventory, and "picking ticket" data generated which is then transmitted via 2200/Tape to the 2200/Tape in Clearfield. There, a printer prints out the forms which clerks use to fill orders from shelf stock. When orders are filled, verification is sent back *the same day* to the central computer and an invoice generated and mailed, also the *same day,* compared to the three to four day lag common with previous methods "This is another way in which our cash float is greatly helped by the Datapoints," said Decker. Swift data reportage also permits computerized compilation of daily "net to sell" reports for Day's sales department which give comprehensive information on shelf stock available to buyers.

Datapoint 2200's are also being used in Day's accounts receivable department, the payroll department and in production planning where their ability to accommodate large volumes of data according to pre-programmed formats is a major advantage. "The Datapoint 2200's have not only streamlined our data entry activities throughout the company but they have added as much as three years of useful life to our present central computer installation," said Decker. "Without them, we would have had to have gone to a larger computer system with RJE terminals for our remote data users at a cost far in excess of what we're paying for the 2200's — and not have their on-site computing capability."

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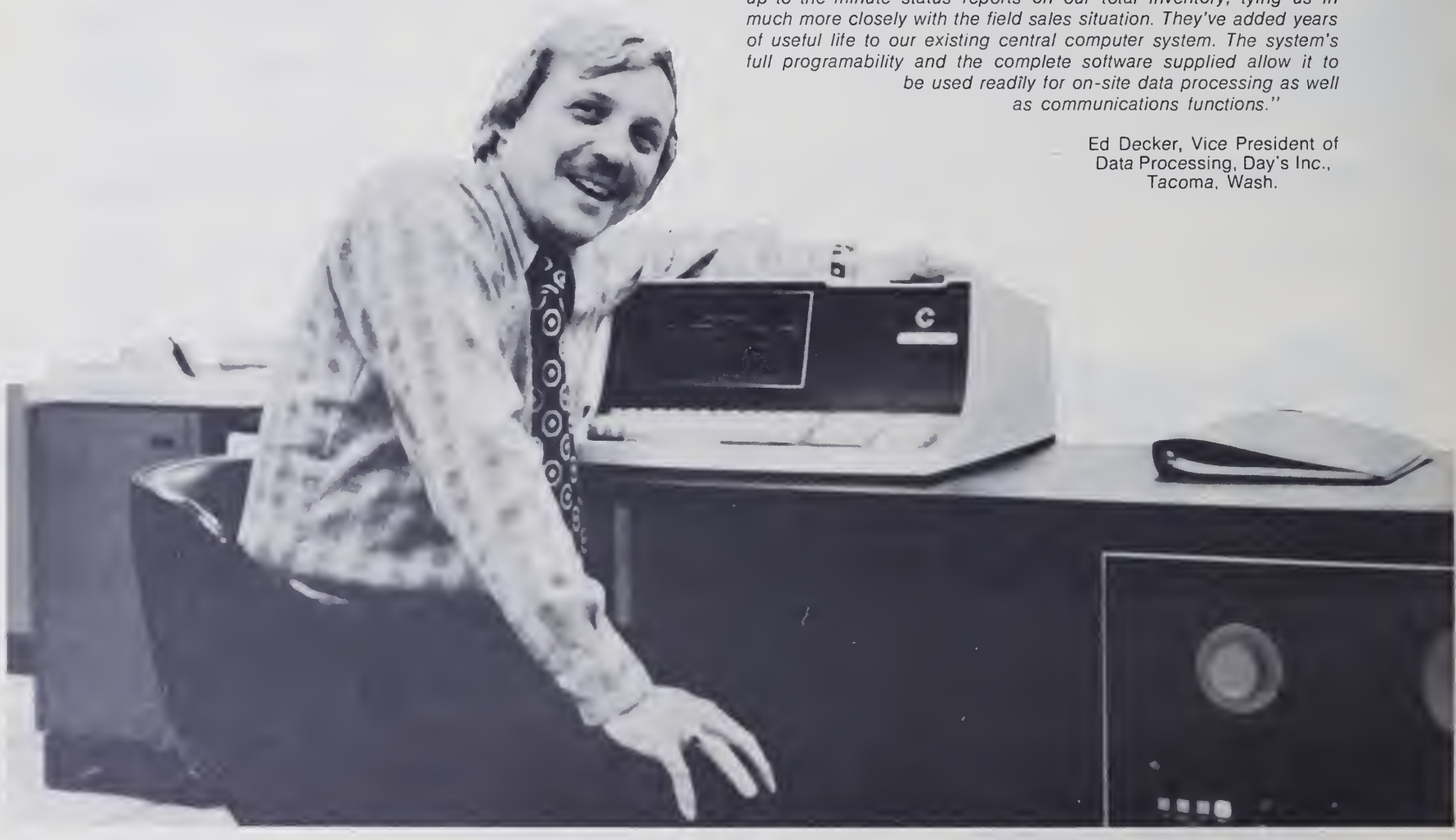
Ed Decker, Vice President of
Data Processing, Day's Inc.,
Tacoma, Wash.



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DP, Radio Stations Harmonize to Make Sweet Music

Special to Computerworld

YORK, Pa. – If there is a formula for good FM radio listening, the Susquehanna stations may have hit on it through a small computer.

Applying computer techniques to proven broadcasting parameters, Susquehanna Broadcasting Co. is cutting weekly tapes for five FM stations that are turning listeners on in increasing numbers.

The parameters are simple enough. Songs and artists are separated so no particular one is played back-to-back or repeated in a four-hour time segment. Also, no half-hour tape is repeated in 68 hours – to avoid a selection being played in the same time slot.

Thus, a station does not follow one Frank Sinatra tune with another and the same Sinatra song will not be played again for at least four hours. And, the tape with the Sinatra piece slotted for 11 a.m. is not run again for 68 hours to avoid repeating the song in the same time frame.

"We could not do what we are doing on a manual basis," explains Robert B. Shipley, group FM program director. "This enables us to stay on target with the type of music we play and it controls repeats," he claims.

The Susquehanna approach is similar to that of the research laboratory where tests are conducted and the results are analyzed for flaws, re-examined and tried until a logical solution is found. In the same vein, the computer goes through a trial and error process, matching and re-

Magnetic disk mounted onto the NCR Century 100 computer contains the selections and artists recorded on half-hour tapes played by the five FM stations.

jecting half hour tapes until the log assembled meets Susquehanna requirements. One result has been an average of less than one hole per week to fill.

Susquehanna makes its program selections from thousands of musical standards, preparing half-hour tapes with selections balanced according to valid listening patterns and established popularity of titles. The company's five FM stations are furnished with several hundred numerically-coded tapes, each containing breaks for news, weather, public service information and commercial announcements. The company's tape-preparation system allows wide flexibility for each station to respond to major news developments or other local occurrences without difficulty. The number of each tape, its selections and artists, are captured on the computer's magnetic disk files.

Then, each Thursday, the computer, applying the program parameters, selects a week's tapes and prints a program log for each day's broadcasting beginning with the following Monday night. If there are any holes, they are filled in manually in York before the logs are distributed to the stations.

While the weekly log indicates when each tape is to be played, a computer list accompanying the tape details the selections, timing and break points.

Besides serving the stations themselves, the computer draws on its disk files to print an alphabetic list of selections and the number of times they're on the tapes. Management uses the report to determine whether the songs are being featured in proportion to their popularity and in keeping with the company's ideas on good listening.

Another computer report shows the frequency with which each tape is being played. The information alerts the programming staff to examine why one tape may be getting more plays than another, or if a frequently broadcast tape may have outplayed its effectiveness.

When the computer is not assembling the program logs for the company's FM

The Small Systems User

stations, it is doing the billing for Susquehanna's cable TV operations, CATV of York, and maintaining the accounts receivable records for seven AM and the five FM outlets.

Bills are prepared by the AM and FM stations and copies are sent to York where the accounts receivable files are updated and aged and sales are analyzed. Aside from typing the bills, the local stations have nothing more to do with billing and accounts receivable paperwork.

On the other hand, the computer prepares the bills sent monthly to some 17,000 cable TV customers. Bills are prepared weekly on a cycle basis and receipts are posted at random daily, at which time the accounts are updated.

The bills are in continuous card format. The company has delayed making the bill a turnaround document because of a large number of exception payments and because the volume has not yet warranted it.

But the bill, according to Larry D. Potteiger, data processing manager, could easily be converted and Susquehanna can do the billing for several additional cable TV companies without appreciably increasing costs.

When orders are received, they are edited and the information is entered into the NCR Century 100. The computer stores the data and prints the necessary shipping copies/bills of lading and order register.

After the orders, which average 150 to 180 daily for all divisions, are shipped, the computer prints the invoices, updates the accounts receivable file, prepares an invoice register and reduces inventories.

Sales and inventory reports are produced daily. Open orders, including current, future and back orders, are reflected in the remaining available inventory. Applying set minimums, the production department can determine output needs.

The computer performs the usual aging that goes with every accounts receivable record-keeping process. There are 20,000 customer records in the file. It also figures the commissions based on the sales information captured on entering the orders. Performance reports by customer and product sales forecasting are two other computerized summaries.

Bar graphs are prepared by the computer which shows each line's production, orders, shipments and inventory. The graphs are used by management in determining output cycles and work schedules.

The computer also processes the weekly payrolls for the manufacturing operation and the semimonthly pay records for the salaried radio personnel.

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Penril's 4800B-1 modem pictured above has been selected by the U.S. Internal Revenue Service for use in its nationwide data communications network.

Cautious User Becomes a Fan of Key-to-Disk

By Michael Weinstein
Of the CW Staff

BOSTON – Questions asked at a workshop here on keypunch replacement indicate users still have basic doubts as to the feasibility of using key-to-disk systems.

Everett Lawton of New England Electric Co. addressed the fears of many users when he told of his experiences as one of the first East Coast users to replace keypunch operations with a shared processor key-to-disk system.

He related how he had set up his key-to-disk operation so input was identical to keypunch input – using 80-column records.

"Quite frankly," he said, "we were scared the system might not work and by having an identical format we could always go right back to keypunching.

"But as we got deeper into our new operation, we found our initial fears were unfounded," he stated.

Lawton's system consists of two identical systems, each with a central processor tied directly to a tape unit. Storage medium for each system is a 2.2M-character fixed-head disk subsystem which accepts input – through the CPU – from 11 terminals.

Data is entered from the terminals and stored on disk until preset times when contents of disk are dumped onto tape for input to the company's central computer, he related.

The major benefit to the company, Lawton stated, was the ability of 12 operators to surpass the work performed previously by 18 keypunch operators.

Also, because the verification techniques were superior, the individual quality of each operator was not so critical, he maintained.

In response to questions about actual throughput under the key-to-disk system, Lawton related how the average input by each operator was now about 10,000 keystroke/hr – with some operators at around 15,000 keystroke/hr. With IBM 029s the standard had been less than 8,000.

Other reasons cited for this improvement included the shared processors' ability to take data in diverse formats.

Using his key-to-disk system data can be entered in the manner most convenient for the operator and later reformatted by the shared processor into a form the programmer desires.

"We pay $5,000 total for both systems including two CPUs, two disk subsystems, two tape drives and a shared printer," Lawton said.

"Of this cost, we pay $75 for each terminal and can add up to 64 terminals to either or both systems for $75 per terminal."

His advice to other users looking into key-to-disk was "be more concerned with the software and always think 'how can I get my operators to reduce the number of steps needed to enter data.'

"In view of retraining it is important that a prospective user get an 029 type of keyboard as this is what his keypunch operators are used to working with," he advised.

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Bell Synthesizer Aimed at Turning Writing to Speech

WASHINGTON, D.C. – In the not-too-distant future travelers may call up for airline reservations and hear a voice that sounds foreign, and has some trouble with pronunciation – but on the other end will be a computer-based device which translates written input into spoken output.

The new unit is still in the development stage, even though a patent has been granted to two members of Bell Labs.

In operation there is no human interaction or recorded audio tape. When a written passage reaches the synthesizing unit, the computer device analyzes the sentences, assigns stress and timing, and finds a phonetic description of each word.

Software for the synthesizer takes into account speech patterns and relationships between spoken and written language. To illustrate some of the problems that must be overcome, one of the inventors pointed out the difficulty in the expression "a nice man."

If the program is faulty, this might be interpreted as "an ice man," he commented.

Application areas being investigated for the new system are reading machines for the blind, a computer-based instruction system and business data systems.

Graphics Data Becomes Digital

ROCKVILLE, Md. – The Model GD-10C (Series 1) Digi-Grid has been unveiled for users wanting a general-purpose, electronic grid digitizing system for conversion of any type of graphic data into digital form suitable for DP processing, according to a spokesman for Computer Equipment Corp.

The Digi-Grid is an electronic grid, free-cursor digitizing system with no moving parts to prepare input from strip charts, scope traces, charts, photos or drawings, the firm's spokesman said.

The electronic console and readout unit includes sign plus 5-digit X-Y coordinate display, basic formatting and interface electronics to a TTY and other output devices, he added.

Units are priced from $15,000 through $22,350 and are supplied with software support.

The firm is at 14616 Southlawn Lane, 20850.

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Task Force Report Blamed *Government Control Feared*

DP Image in Canada at 'All-Time Low'

By Judy Kramer
Of the CW Staff

TORONTO – The computer/communications industry needs to devote considerably more attention than it has in the past to the public interest, according to Gordon Inns, Bell Canada's vice-president of computer communications.

"The public image of computers in Canada is at an all-time low," Inns said, thanks to the recent report of the Task Force on Computers and Privacy [CW, Dec. 20, 1972] which, among other things, found "more personal information being collected than most Canadians probably suspect . . . and made available to a larger number of users than is probably supposed." And the result of this poor public image, he added, is likely to be increased government involvement.

Speaking at a recent meeting of Digital Equipment Corp. users here, Inns said concern over computers is really concern over communications, since it is the information retrieval and transmission capability which make data banks a potential threat to the public.

Innovation Needed

To improve this image and prevent government regulation, Inns suggested, the industry needs to innovate and to improve existing services and make them more economical for data users.

"Although the basic telephone network is still a versatile and almost universally available network for carrying low-speed data, its accuracy is not as good as desired for data," he admitted. And the long holding times of time-sharing terminals make long distance time-sharing via the switched network expensive.

To take the load pressure off the telephone network, Inns said, Bell Canada is developing specialized data networks and services.

Some of these new offerings include:

- The Multicom network, a switched, dial-up configuration offering a set-up time of three seconds and transmission speeds up to 50 kbit/sec.
- Software Controlled Communications Service which uses minis as front-end communications controllers.
- New data terminals including Datacom 300, a high-speed teletypewriter terminal and the Vucom I CRT terminal.
- Increased use of digital transmission which would reduce the costs of computer communications. A trial digital network was established in 1971 with "most successful" results.
- The formation of a Computer Communications Group in conjunction with the Trans-Canada Telephone System, to provide complete service (including hardware, system design and implementation) for data users.

Rewards of User 'Shopping Around' Outweigh Software Building Costs

WASHINGTON, D.C. – When the data communications user goes to a source other than the mainframe maker for his communications processor and terminals, he has to pay a price – the cost of developing the software for the system – but the rewards outweigh that cost.

That is the opinion of Air Force Major Glen Vincent of the Defense Intelligence Agency.

"If the user is satisfied with the terminals and processors offered by the mainframe maker, then he can use the software that those manufacturers have developed," he told a recent Caravan/73 session.

But, he noted, those manufacturers have little desire or reason to make software that will work with other systems and there are few standards that could force them to make such interchangeable software.

So if the user is not completely satisfied with the offerings of his mainframe maker in the communications area, he will have to write his own software for the front-end processor in order to handle the terminals. Or if he doesn't have the capability to have it written in-house, he will have to turn to an outside software developer and pay for it.

"If the user breaks away from the manufacturer of the host system," he said, "he will have to pay the price of developing the software. But the benefits offered by non-mainframe-made communications equipment outweigh this price in most situations.

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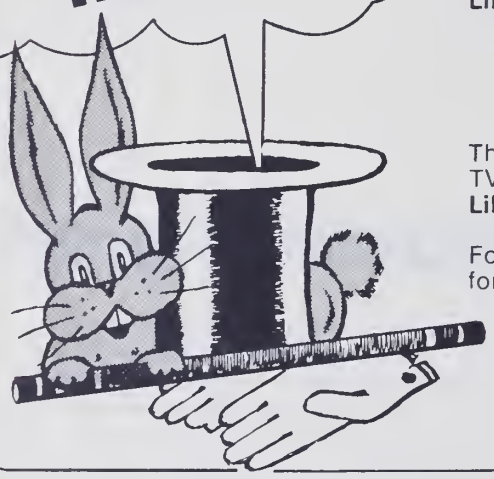
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COMPUTER INDUSTRY

CI Notes

IBM Papers Remain Secret

TULSA, Okla. – The Computer Industry Association (CIA) has lost in its bid to get some of the secret documents released to the public in the IBM vs. Telex case being heard here.

Judge A. Sherman Christensen did not specifically rule on whether the 25 documents in question actually contained trade secret information.

But he said there had been "insufficient showing" by CIA to justify the release of the requested documents to it at this time, "specifically because all the documents in question together with a vast number of others doubtlessly will be introduced in evidence and thus become public in any even during the early stages of the trial . . ."

IBM, Itel Agree on 30s

SAN FRANCISCO – IBM has agreed to maintain on a worldwide basis IBM 360/30s with Itel Corp./Advanced Memory Systems, Inc. add-on memory beyond IBM limits.

Under the agreement, IBM will extend to all countries – where it has Model 30 service capabilities – service on the same basis as in the U.S.

In addition, IBM agreed to pay Itel 97% of court costs and expenses incurred in a West German trial on this issue [CW, Feb. 14]. Itel, in return, agreed to withdraw the judgment of the German court and its appeal in France.

Supershorts

Pitney Bowes Data Systems Ltd., a newly created subsidiary of Pitney Bowes, will market electronic point-of-sale and related systems in Europe. Operational and marketing headquarters will be in London.

– – –

Eldorado Computer Corp. has obtained U.S. marketing rights for Hermes Products, Inc. systems equipment.

– – –

Tally Corp. has signed an OEM agreement with Hewlett-Packard, S.A. of Brussels, Belgium, for the sale of Tally Series 2000 Line Printers for use in HP computer systems for the wholesale and retail distribution industry.

– – –

Digital Information Devices, Inc., has appointed Data Dynamics Ltd. as its exclusive representative in Great Britain and 12 countries in Europe, and non-exclusive representation in seven other nations including Scandinavia.

– – –

Pertec Corp.'s 3700 computer output microfilm readers will be marketed by Synergraphics Inc., a microfilm service subsidiary of Transamerica Corp.

DP Doors Should Open in 1977

Japan Makers OK Liberalizing Imports

By E. Drake Lundell Jr.
Of the CW Staff

TOKYO – Japanese computer manufacturers have reportedly agreed to cooperate with government plans to liberalize the importation of DP equipment starting in 1977. In return, the government has promised increased support for their domestic operations.

The agreement announced here last week called for the heavy supports in order to offset the increased competition from foreign computer makers, especially Americans.

It also contains an escape clause which would permit the Japanese to reimpose heavy import restrictions if the competition became too heavy.

In addition, the agreement would liberalize the rules for the imports of integrated circuits starting in 1975, sources said.

Under present regulations it is very difficult for an American manufacturer to get permission to import equipment into Japan and the present regulations effectively ban any imports if the foreign share of the market reaches over 50% of the market in any one year.

The new liberalized rules were agreed to by the Japanese computer industry after reportedly heavy political pressure had been placed on it by the U.S. Government, which is upset over the restrictive regulations – particularly in view of the recurring dollar crises and the Japanese balance of payments surplus resulting from Japanese exports to the U.S.

Payoff

Up to now the Japanese computer industry has been receiving from its government around $510 million yearly for research and development support. But under the new arrangement it would get an additional $200 million yearly in return for its agreement to allow the liberalization in the rules regulating the importation of computer mainframes.

The industry would also receive around $200 million in the form of loans to the Japan Electronic Computer Co., the financing arm for the Japanese industry.

The Japanese industry would also receive around $30 million for research and development work in software and approximately $20 million for integrated circuit research.

Market Potential

The Japanese computer market is one of the fastest growing in the world, according to International Data Corp. (IDC), a market research firm that estimates the use of computers in Japan has been growing at an annual rate of 40% for the past six years.

In addition, IDC estimates the Japanese market will continue to grow at an "above average" rate for the next few years.

U.S. manufacturers have been frustrated in efforts to penetrate the Japanese market since the Japanese Government considers its fledgling computer industry a national resource and has erected trade barriers to protect it, in addition to providing large subsidies to support research and development efforts.

"This is a case of too little too late," one industry source indicated last week. With all of those subsidies for research and development, he indicated, "the Japanese industry is going to be pretty strong by the time they open the door to us. It may be impossible to compete then anyway on their own ground," he said.

The new agreement does not ease the "buy Japan" policy of the government in any way, several sources observed.

Adapso Asks Permanent Exclusion Of IBM From Data Center Sector

By Molly Upton
Of the CW Staff

NEW YORK – The Association of Data Processing Service Organizations (Adapso) has submitted a position paper to the Justice Department calling for the permanent exclusion of IBM from the data center business.

Under the terms of the settlement with Control Data Corp. involving the sale of the Service Bureau Corp., IBM agreed to withdraw from the data center business for a period of six years.

The paper noted that Adapso Data Center Section believes the transfer of the Service Bureau Corp. should "resolve the special tie-in problems of its segment, provided:

- "The complete separation is formalized by court decree, so that it is not subject to later change by private action.
- "It is made permanent and not limited to the six years which IBM has consented to stay out of the data center segment.
- "It is made clear that IBM's exclusion from the furnishings of data center services is complete and includes commercial and scientific DP services; batch processing; remote job entry processing; time-sharing services; data preparation services; and facility management operations.

"Such exclusion should also prohibit the supply of any 'back-door' entry into the data processing services industry," the paper stated.

This paper is the second submitted to Justice by Adapso in its efforts to advise Justice in the pending litigation against IBM [CW, Feb. 28].

The association's general position urges the elimination of "tie-ins" or linking together of separate products and activities of IBM and other manufacturers.

Reaction to IBM Lease

Lessors Say Prices Still Lower

By a CW Staff Writer

NEW YORK – Leasing companies tentatively welcomed IBM into the long-term leasing business last week by pointing out their prices were still lower than the new ones offered by IBM, which dropped the overtime usage charge on all virtual 370s.

At the same time, they noted the IBM move to give users a four-year lease indicates IBM is "blessing" the concept of leasing, a move they said might potentially open up new markets for them among users who had previously shied away from the concept.

"We are still very competitive with IBM even without the overtime charges," one leasing company vice-president said. However, he admitted the shorter term leases were not as competitive without the overtime charges from IBM as they had been before.

Previously, he noted, leasing companies had figured the overtime charges as part of the IBM rental when making comparisons with their lease rates. "What used to be a 40% advantage for us," he noted, "is now a smaller advantage, around 20% to 25%."

"On the longer term deals we could beat the IBM straight rental price; the overtime charges just served to make us look even better than we were on the straight monthly rental plan," he said.

"If users start thinking in terms of signing up for longer deals since it is now encouraged by IBM, then we should be able to pick up some business. After all, if they have made the decision to save the overtime charges by turning to a four-year deal from IBM, why wouldn't they decide to save an additional 20% to 30% by signing up for a five-year deal with one of the leasing companies?"

Still another leasing executive also saw the IBM plan as a help to the third-party leasing companies.

"For years," he said, "IBM has been pushing short-term leases so that the user wouldn't, IBM said, be stuck with obsolete equipment. With the new plan, however, they are in essence assuring users that the equipment will have a life of at least four years, thereby taking the onus away from long-term leases."

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'Technology, Not Labor, the Key'

World Trade Head Defends Multinational Cause

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. – IBM rolled out one of its big guns here last week to defend multinational corporations like itself from a combined congressional and labor attack.

Gilbert E. Jones, chairman of the IBM World Trade Corp., contended that multinational corporations were not in fact exploiting jobs but rather that the overseas operations helped to create jobs in the U.S.

This position is essentially backed by the Nixon Administration, but a coalition of Democratic congressmen and organized labor has attacked the multinationals claiming the firms move plants to areas where labor is cheaper and thus deprive U.S. workers of jobs.

This coalition also claims that by manufacturing at plants overseas the multinationals – like IBM – don't contribute as much as they could to U.S. exports.

IBM was called to testify because in the words of Sen. Abraham Ribicoff (D-Conn.), head of the Senate Subcommittee on International Trade, "when one thinks of multinational companies, one immediately thinks of IBM."

Crossroads

"There is no mistaking the fact," Jones told the senators, "that we have come to a crossroads in the evolution of American foreign policy. Decisions that will be made in the next few months by the Congress will affect future domestic and international economic patterns in fundamental ways."

With mounting criticism of the activities of multinational firms, Jones said it was time for firms such as IBM – which do business on a multinational basis – to "confront" the critics.

Jones claimed the greatest strength of U.S. business was the fact that it held a technological edge over business in other countries and that by maintaining this edge it would be able to compete effectively.

In high technology industries such as the computer industry, he said, the labor content of the equipment was not the major factor, but rather technical innovation was.

Therefore, he noted, "the key for successful governmental policy is the creation of a climate which will encourage innovation and improvement in American industry, not sheltering it from competitive forces," through tariff restrictions or other means.

Congress should "avoid thinking in terms of days gone by, when handcrafts and high labor content were the general rule in American plants," the IBM executive said.

"Rather, we should think in terms of the '70s and the '80s when our ability to compete will depend primarily on our technological innovation, our creative abilities and our salesmanship."

He noted that on previous occasions it had been estimated that one out of every eight jobs at IBM in the U.S. was directly related to export business, but stated that in 1972 one out of every five IBM U.S. jobs was directly related to overseas operations.

Investment Reality

And, Jones contended, "there is absolutely no way in which we could have held onto our markets overseas, and increased U.S. jobs these last dozen years, if we had refused to invest in foreign facilities."

This is because many overseas governments would not allow themselves to drain their foreign reserves in order to import all of the equipment that they presently buy from IBM plants overseas, he said.

Although Jones admitted that "I cannot prove it to you scientifically, if IBM tried to serve the world market entirely from the U.S., our business abroad would shrink to a very small fraction of its present size," he said.

"The choice for us is not between exporting or manufacturing abroad, but between manufacturing abroad or losing large portions of the world market."

In addition, Jones said that out of the 115,000 persons employed by World Trade, only 27,600 were in manufacturing positions, and therefore if all manufacturing was done in the U.S. it would only add that many jobs to the rolls.

Bleak Future?

Jones concluded that if U.S. legislation should "handicap American computer manufacturers in their overseas operations, the technology gap that still favors the Americans would tend to close. Foreign manufacturers eyeing expanded markets – including the U.S. – would be helped. The damage done to the U.S. economy would be considerable, perhaps irreversible.

"In our view, the proper response is legislation that looks toward the elimination of trade barriers, including, and most importantly, non-tariff barriers that discriminate against U.S.-owned companies operating abroad," he said.

"Far from treating U.S.-foreign investment as a threat, we must regard it as an important national resource that can provide U.S. exports, U.S. jobs, surpluses for the U.S. balance of payments and technology essential for progress in the U.S."

IBM Denies Charge Of Dollar Speculation

WASHINGTON, D.C. – One of the most serious charges against multinational companies concerns the speculative use of their reserves of currency overseas which puts pressure on the U.S. dollar.

When speculation on the dollar was at its height recently, the former finance minister of West Germany, Karl Schiller, was quoted on CBS News of accusing IBM of selling dollars for German marks, in effect helping drive the price of the dollar down in international markets.

IBM denied the charge and earlier in the day, IBM World Trade Corp. Chairman Gilbert E. Jones had told a Senate panel that IBM refused to speculate in world currencies in order to make a profit on the decline of the dollar overseas.

However, several sources have wondered whether a large multinational firm would not be forced to do some speculating just in order to protect its stockholders' investments.

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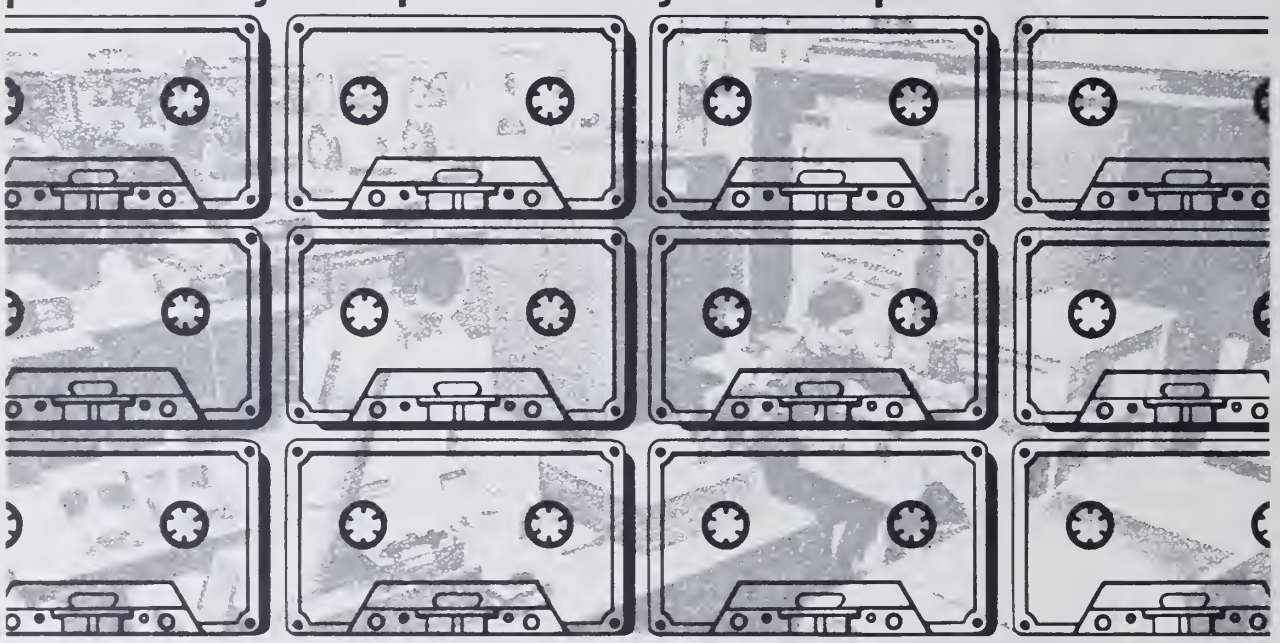

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GSA Awards 370 Contracts

Memory Bids 60%-70% Off IBM Price

By a CW Staff Writer

WASHINGTON, D.C. – Substantial price reductions marked the latest round of bidding for add-on and replacement memory contracts with the General Services Administration here.

And when the dust had cleared, Memory Technology, Inc. won the award for replacement memory on IBM 370/155s while Ampex landed the order for memory on the government's 370/165s.

In order to get the 155 bid, Memory Technology offered the government 262K of semiconductor memory for the 155 at a price of $55,570, which is 60.6% off the original IBM price for the same increment of memory.

The bidding was even tougher in the 165 area; Ampex had to take 70.5% off the original IBM price in order to get the bid at $83,526 for one 512K increment of core memory.

Under the requirements-type contracts, any government agency that does business through the GSA must purchase either the Ampex or Memory Technology type of memory if it wishes to replace or add memory onto its system.

Earlier Award

While this is the first big government award for Memory Technology, Ampex shared an earlier GSA award with Cambridge Memories, Inc. for replacement and add-on memory for the 360/30, 40, 50 and 65 computers as well as the Univac 1106 and 1108 [CW, Feb. 28].

To get that bid, the firms offered prices that were 76% to 88% off the original IBM prices for the equivalent types of memory.

Six European Firms Share in Pact From Space Research Organization

DARMSTADT, W. Germany – Six European computer firms will share in contracts recently announced by the European Space Research Organization (Esro).

ICL, Siemens, Compagnie Internationale pour l'Informatique (CII), Logica, Sesa and AEG-Telefunken were chosen to provide a real-time system for the European Space Organization Center here.

IBM is the existing supplier to Esro.

ICL is scheduled to supply a number of System 4-72s, while Sesa and Logica will direct project management and provide software and special hardware.

The real-time system will be based on two CII 10070s and six Siemens 330 systems.

The CII units will process all control and experimental information generated by a satellite, while the Siemens computers will generate information on graphic displays and handle experimental data acquisition from the satellite.

CIA Expands Membership Base

LOS ANGELES – The Computer Industry Association has broadened the base of its membership with eight new members.

"I am very happy to add that it is no longer possible for CIA to be considered an association of peripheral companies," noted President Dan L. McGurk.

"Our membership includes companies from the software, components and processor segments of the industry. We expect to expand still further to include as broad a representation as possible," he added.

With the new members, CIA picked up representation from the minicomputer segment, General Automation; the software area, with Informatics and Foresight Systems, Inc.; as well as component and peripherals makers. Other new members are Advanced Memory Systems, Cambridge Memories, Inc., Xytex Corp., Applied Magnetics and Information Magnetics Corp.

Aussies Keep Tariff

CANBERRA, Australia – The Federal Cabinet has decided to defer any amendment to the tariff on CRT display terminals while the Tariff Board considers the position of the electronics industry overall, according to Lance H. Barnard, acting prime minister.

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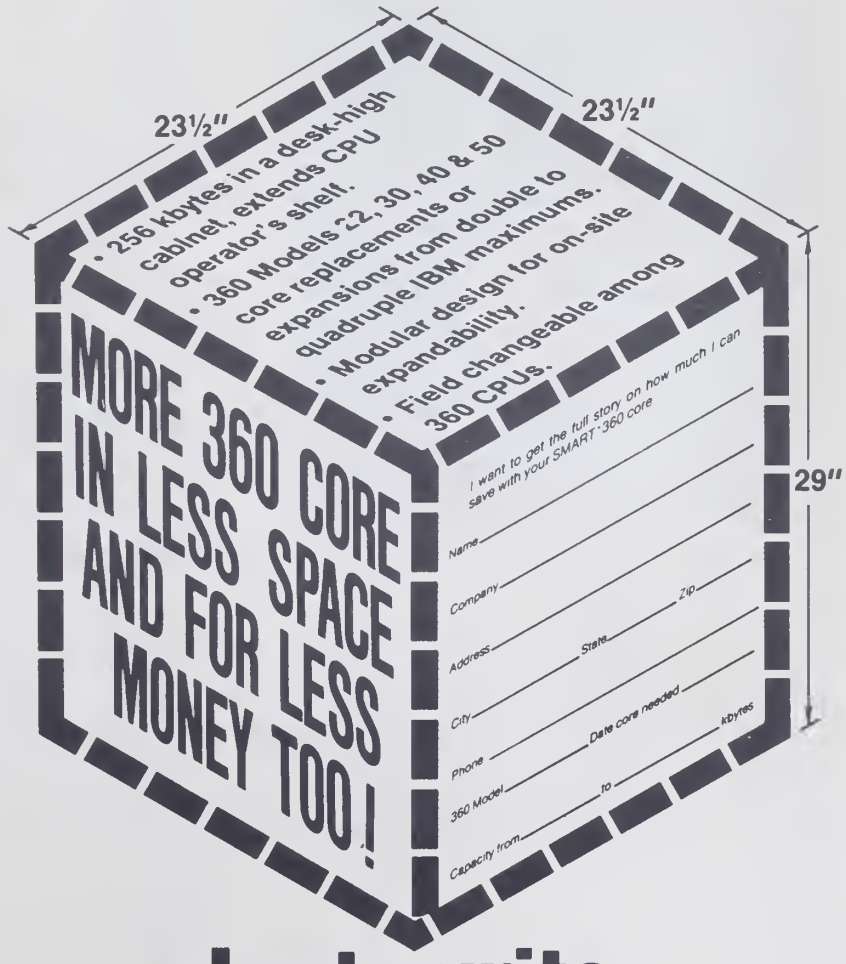

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Contracts

The Potomac Electric Power Co. has awarded a $10 million contract to System Monitoring Division of Rockwell International Corp. to develop a computer-based energy control system. The system will monitor and control the utility's entire generation and transmission network.

Commonwealth Edison Co., Chicago, has engaged Control Data Corp.'s Professional Services Division to help develop a computerized system for the accountability of nuclear reactor fuel assemblies. The system will provide Edison with a computerized library of current and historical data on the firm's assemblies.

The Department of Defense has asked Medlab Computer Services, Inc. to install a $1 million clinical laboratory information system at the Bethesda (Md.) Naval Hospital. The contract also provides the Navy with options on two additional systems.

Data Transmission Co. (Datran) has awarded contracts to Burroughs Corp., Comten, Inc. and Paradyne Corp. for the construction of its nationwide digital data communications network. Datran declined to announce the value of the multi-million dollar awards.

Burroughs will provide the customer terminal interface unit and the fault alarm and control system, Comten will manufacture the stored program computer switch controller. Paradyne was selected to make 4,800/9,600 bit/sec modems and installer test sets.

The Business Data Systems Division of Northrop BSL has contracted with Microdata Corp. for its 1600 Series minicomputers. The minis will be the heart of BSL's real-time business data system, the BDS 2000 Series.

Western Union Telegraph Co. has awarded a contract to International Communications Corp., a Milgo subsidiary, for 2,000 modems. One application of the modems will be Western Union's new Multipoint Data Service.

Evolution the Key

AJ Looks at Data Entry Market

By E. Drake Lundell Jr.
Of the CW Staff

MOUNTAIN VIEW, Calif. – Even though the firm is best known for acoustic couplers, the majority of Anderson Jacobson's (AJ) business in terms of dollars is in the terminal area and the firm is presently taking a close look at the data entry portion of the market.

But whatever moves the firm makes in this area will be on an evolutionary basis; that is, new products will be designed to take advantage of features of present ones, much like the firm's entry into the terminal field, according to Gerry Schoenwald, director of marketing.

The firm got into the terminal business because some customers on their own were integrating the Anderson Jacobson acoustic couplers with teletypewriters so the firm decided to do it for them.

But as the terminal market grew, the firm then added more and more of its own electronics and other parts to the basic system, so that now its latest terminal, the 630, is a 100% Anderson Jacobson product from thermal printer through coupler.

"We moved into the terminal business because it broadened our base," Schoenwald said, "and because it was a natural move up."

Overpopulation

The acoustic coupler business, he said, was extremely crowded and very price-competitive because almost anyone could get into the field without a major investment.

But, he added, it was much harder to become a terminal company and therefore the number of competitors, while large, was not as large as in the coupler business.

Presently, he said, couplers and modems only account for around 10% of the firm's business on a dollar basis with the rest coming primarily from the terminal area.

The firm's entry into the data entry marketplace will probably come about in the same way, Schoenwald indicated, if it decides to get into the market.

The firm is presently marketing one cassette recorder and is working on the development of a "high-performance" unit that should be ready before the end of the year.

Parts Are There

The combination of these devices with the equipment used in putting together the firm's terminal line could be used to make either data entry or data acquisition systems, Schoenwald related.

The major need would be software, and this is an important consideration when entering the data entry field, Schoenwald stressed, and a firm has to make a choice between offering generalized packages or customizing systems for specific applications.

Even though Schoenwald emphasized that the firm had "just started looking at the data entry area," he indicated that modular systems might be the best product in the future.

For example, he said a firm might want to offer a system that could either have cassettes for data storage or, optionally, a floppy disk for storage. Then the user could choose the system that best met his particular needs.

In other areas, Schoenwald noted the firm was planning basically to expand its terminal lines with higher speed or more capable units, with the area of remote batch terminals under study.

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Sanders Doubles Quarter, Half Earnings

NASHUA, N.H. – Sanders Associates, Inc. doubled its earnings in the second-quarter and six-month periods ended Jan. 26 compared with comparable periods last year.

"Results for the first six months confirm our confidence that we will achieve our goals for fiscal 1973 – increased sales and significant profit improvement quarter by quarter through the year," observed President Royden C. Sanders Jr.

In the quarter, Sanders earnings reached $1.1 million or 24 cents a share compared with $559,000 or 12 cents a share in the year-ago period.

Special credits totaled $318,000 in fiscal 1973 compared with $113,000 last year.

Revenues rose 18% to $43.1 million compared with $36.6 million. Revenues have risen for six consecutive quarters, the firm noted.

For the half, Sanders earnings totaled $2.1 million or 46 cents a share compared with $1 million or 22 cents a share in the year-before period. Sales climbed to $81.8 million from $66.2 million in the same period last year.

SEL Earnings Drop on Revenue Gain

FORT LAUDERDALE, Fla. – Systems Engineering Laboratories, Inc. experienced a decline in six-month earnings and an increase in revenues.

With a heftier special credit of $349,709 or 13 cents a share, earnings totaled $539,390 or 20 cents a share in the period ended Dec. 29, compared with $581,212 or 23 cents a share last year, when the special credit was $201,832 or 8 cents a share.

Revenues rose slightly to $7.6 million from $7.1 million in the comparable year-ago period.

Revenues Rise For Vermont

N. SPRINGFIELD, Vt. – Vermont Research Corp. saw first-quarter revenues rise in the period ended Dec. 31.

Revenues climbed to $1.4 million from $1.3 million a year ago, while earnings, boosted by a $205,000 credit, totaled $307,000 compared with $115,000 in the same period last year. The credit resulted from the sale of securities of Consolidated Computer, Inc.

Vermont has completed the acquisition of OMI Memories, Inc., which has developed a prototype moving-head disk.

Operating expenses of the new unit, called VRC California, will be written off as incurred, according to President Hugh M. Taft.

"Also, it will be some time before any significant revenues will be derived from sales of this moving-head disk product," he said.

The immediate net effect of the merger will be a substantial reduction in our earnings in the second quarter ending March 31, 1973, and succeeding quarters, until disk sales can be achieved in some volume," he added.

Simplicity Heralds Fourth Record Year

NEW YORK – Simplicity Computer Corp. continued its streak of reporting record sales and earnings for its fourth consecutive year.

Leasing accounted for about 40% of revenues, up from 30% last year, and a "sharply higher percentage of our profits," according to President Louis Marolda. Simplicity specializes in the long-term leasing of IBM 360/20's and other small satellite computers.

The firm's DP subsidiary, Babbage Systems, Inc., also contributed to earnings.

Earnings for the year rose 75% to $177,293 or 35 cents a share from $102,959 or 21 cents a share last year. Revenues rose 35% to $2.8 million from $2.1 million in 1971.

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Fixed-Price Contracts Blamed

2 Software Firms Show Charges

Losses on fixed-price software contracts were reflected in the nine month reports of Informatics Inc. and Cybermatics. Informatics, however, reported increased earnings for the period, while Cybermatics reported a loss.

Nine month earnings and revenues were improved at Informatics compared with the year-ago period, when a loss of 7 cents a share from discontinued operations was included.

Earnings totaled $349,000 or 23 cents a share compared with $296,000 or 19 cents a share in the year-ago period. Revenues rose to $13.3 million from $12.7 million.

"Especially good progress has been made in volume growth in the commercial areas of communications and software products, and in the civilian agency government sector," observed President Walter F. Bauer.

Performance in all areas increased significantly since last year except revenues from three Nasa contracts, he said.

A provision of $55,000 to cover estimated losses on a large fixed-price contract scheduled for completion in the fall was included in the period, the company said.

Two Contract Losses

At Cybermatics, the loss of $662,150 or 66 cents a share on revenues of $5.7 million for the nine months ended Dec. 31 resulted from a $216,575 provision for losses on two fixed-price contracts, as well as $210,599 in non-recurring charges to income. Changes in accounting procedures were also reflected in a $242,822 charge.

In the previous year the firm earned $216,717 or 20 cents a share on revenues of $4.6 million.

Cybermatics changed its policy of accounting for research and development expenses from a deferral method to a current expense method.

After three quarters of significant losses, the Software Division returned to profitability in the month of January, the firm said. Cybermatics' participation in the continuous computer forms and pressure sensitive labels businesses accounts for about two-thirds of consolidated revenues, observed President J. Roy Morris.

Morris added he expects Cybermatics to return to profitable operations during the fourth quarter and during the next fiscal year.

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Pitney Bowes Absorbs $1.4 Million Charge for POS Unit in 4th Period

STAMFORD, Conn. – Pitney Bowes has begun to write off its share of the charges for jointly-owned Pitney Bowes-Alpex, Inc., maker of point of sale systems, but Pitney Bowes' overall profits were more than sufficient to absorb the $1.4 million charge for the fourth quarter and year ended Dec. 31.

However, for the first quarter of 1973, President Fred T. Allen sees earnings "about the same" as those of the comparable year-ago period. Operating earnings are expected to rise, and revenues should be up 10% to 15% from $76.1 million in the first quarter of 1972.

The $1.4 million special charge reflects Pitney Bowes' first quarter share of $18.6 million in operating losses and charges for the amortization of the previously deferred startup costs of Pitney Bowes-Alpex.

Fourth quarter earnings totaled $4.5 million or 34 cents a share, up from almost $3 million in the year earlier period. Revenues climbed to $98.1 million from $83.7 million in the fourth quarter of 1971.

Although mailing equipment currently accounts for 71% of the firm's revenue, in five years revenue is expected to be split evenly between mailing equipment, copiers and retail systems, Allen said.

Acquisitions

A merger has been consummated between Axicom Systems, Inc. of Paramus, N.J., and Transport Data Communications, Inc., Greenville, S.C. The agreement provides for an exchange of common stock of the two corporations.

Control Data Corp. has acquired all the outstanding common stock of Nuclear Associates International Corp., Rockville, Md., in exchange for shares of Control Data common stock.

GTE Information Systems Inc. has acquired EDP Resources Inc.'s 75% interest in EDP Resources Deutschland AG, West Germany, for $3.4 million.

Mathematical Applications Group, Inc., Elmsford, N.Y., has acquired the Swedish firm of Stroede, AB, through its wholly owned Swedish subsidiary, Industri-Matematik, AB, based in Gothenberg, provides complete mailing and computer services.

Network Data Processing Corp. of Cedar Rapids, Iowa, has purchased all the payroll account business from Data Services, of Iowa, Inc.

Itel Corp. has agreed in principle to acquire First National Indemnity Co., a Texas insurance company in the mortgage guaranty field, for an undisclosed amount of common stock.

William Marion Co., Inc. of New York City has acquired all the inventory and leases of E.D.P. Leasing Corp.

Charterhouse Canada has agreed to acquire a significant minority interest in Comma Services, Ltd.

Nickels & Dimes

Computer Machinery has reduced its line of credit with Security Pacific National Bank and First National City Bank to finance U.S. leases. Under a new agreement, CMC may borrow up to $15 million through February 1974, including loans outstanding under the old agreement, which had an upper limit of $20 million.

$$$

Lots of activity in the stock splitting department: Datapoint stock had a reverse split of 1 for 2-1/2; Data General stock will split 3 for 1 payable March 22 to stockholders of record March 7; and Texas Instruments shareholders vote April 18 on a 2 for 1 split.

$$$

In the name game, Computing & Software is now Cordura.

$$$

Computer Financial, now Lencor International, posted record nine month earnings for the period ended Dec. 31, and attributed the rise primarily to increased demand for disk packs.

$$$

Electronic Memories & Magnetics will pay a preferred share dividend of 25 cents March 10 to shareholders of record March 2. The dividend has been omitted since the fourth quarter of 1971.

$$$

Graham Magnetics declared a 3% stock dividend to shareholders of record Feb. 23.

$$$

On-Line Systems common stock will split three-for-two payable March 7 to shareholders of record Feb. 14.

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Western Digital, circuit and test system maker, passed the break even point for monthly operations during the quarter ended Dec. 31, and cut its losses for the period by 59% from the year-ago period, to $139,887.

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Scan-Data has recorded third-quarter shipments of nine systems.

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Computerworld Stock Trading Summary

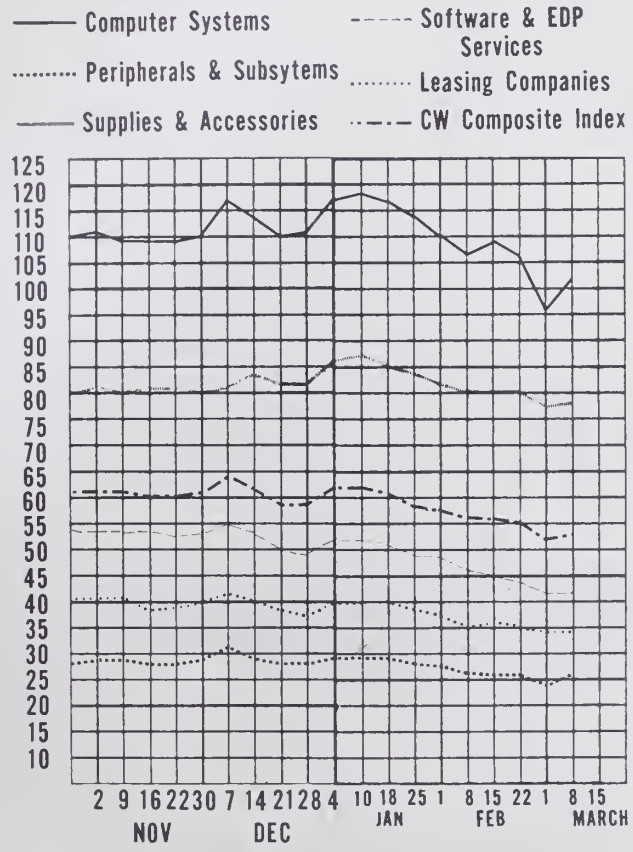
All statistics compiled, computed and formatted by TRADE★QUOTES, INC Cambridge, Mass 02139

CLOSING PRICES THURSDAY, MARCH 8, 1973

EXCH		1972-73 RANGE (1)	CLOSE MAR 8 1973	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 3	1 5/8	+ 1/8	+8.3
A	APPLIED DATA RES.	3- 7	3 1/2	+ 3/8	+12.0
O	APPLIED LOGIC	1- 4	2 1/2	- 1/8	-4.7
N	AUTOMATIC DATA PROC	69- 99	68 3/4	-4 7/8	-6.6
O	BRANDON APPLIED SYST	1- 2	5/8	- 1/8	-16.6
O	COMPUTER DIMENSIONS	3- 14	3	- 3/8	-11.1
O	COMPUTER DYNAMICS	1- 4	7/8	- 1/8	-12.5
O	COMPUTER NETWORK	2- 7	2	- 1/4	-11.1
N	COMPUTER SCIENCES	4- 10	4 1/8	0	0.0
O	COMPUTER TASK GROUP	1- 2	1 1/2	0	0.0
O	COMPUTER TECHNOLOGY	2- 8	2 3/4	0	0.0
O	COMPUTER USAGE	6- 14	6 1/2	+ 1/4	+4.0
N	COMPUTING & SOFTWARE	9- 28	9 5/8	- 1/4	-2.5
O	COMRESS	1- 3	3/4	0	0.0
O	COMSHARE	5- 10	6 7/8	- 1/4	-3.5
O	DATATAB	4- 9	3 1/4	- 1/4	-7.1
O	EDP RESOURCES	1- 8	1 5/8	+ 1/8	+8.3
A	ELECT COMP PROG	1- 5	1 1/2	0	0.0
N	ELECTRONIC DATA SYS.	43- 65	52	+3 3/8	+6.9
O	INFORMATICS	3- 11	3 5/8	- 1/8	-3.3
O	I.D.A. DATA CORP	1- 3	3/4	+ 1/8	+20.0
O	KEANE ASSOCIATES	4- 7	3 3/4	0	0.0
O	KEYDATA CORP	7- 13	8 5/8	+ 1/8	+1.4
O	LOGICON	4- 9	5 5/8	+ 1/2	+9.7
A	MANAGEMENT DATA	3- 10	3	- 1/4	-7.6
O	NATIONAL CSS INC	8- 41	38 1/2	+5 5/8	+17.1
O	NATIONAL INFO SRVCS	1- 5	1 7/8	0	0.0
P	ON LINE SYSTEMS INC	5- 19	16 5/8	+2 5/8	+18.7
N	PLANNING RESEARCH	4- 17	3 3/4	- 3/8	-9.0
O	PROGRAMMING METHODS	20- 25	23 5/8	+1 3/8	+6.1
O	PROGRAMMING & SYS	1- 2	3/4	0	0.0
O	RAPIDATA INC	5- 27	20	-1 1/4	-5.8
O	SCIENTIFIC COMPUTERS	1- 4	1 1/2	+ 1/4	+20.0
O	SIMPLICITY COMPUTER	1- 5	2 3/8	- 1/2	-17.3
U	T&S COMPUTER CENTERS	3- 6	3 1/4	0	0.0
O	TCC INC	1- 3	1/4	- 1/8	-33.3
O	TYMSHARE INC	7- 12	8 3/8	+ 3/4	+9.8
O	UNITED DATA CENTER	5- 8	5 1/2	+ 1/4	+4.7
N	UNIVERSITY COMPUTING	7- 26	9 1/8	0	0.0
A	URS SYSTEMS	6- 10	5 5/8	0	0.0
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	23- 49	24	+1 1/	.
O	ADVANCED MEMORY SYS	12- 23	18 1/4	+1 5/8	+9.7
N	AMPEX CORP	5- 15	5 7/8	- 3/8	-6.0
O	ANDERSON JACOBSON	4- 8	5 3/4	0	0.0
O	BEEHIVE MEDICAL ELEC	1- 8	7	+ 1/4	+3.7
A	BOLT,BERANEK & NEW	5- 21	11	+2 1/4	+25.7
N	BUNKER-RAMO	7- 14	6 7/8	- 5/8	-8.3
A	CALCOMP	9- 25	11 3/4	+ 1/4	+2.1
U	CAMBRIDGE MEMORIES	9- 15	11 1/4	+ 5/8	+5.8
O	CENTRONICS DATA COMP	6- 28	20 1/2	-1	-4.6
O	CODEX CORP	6- 25	14	+1	+7.6
O	COGNITRONICS	1- 5	1 1/2	0	0.0
O	COMPUTER COMMUN.	1- 7	2 3/8	- 1/8	-5.0
A	COMPUTER EQUIPMENT	2- 4	2 1/4	+ 1/4	+12.5
O	COMPUTER MACHINERY	7- 13	11	+ 7/8	+8.6
O	COMPUTER TRANSCEIVER	2- 9	2 5/8	- 1/8	-4.5
A	COMPUTEST	3- 9	4 1/2	0	0.0
N	CONRAC CORP	24- 39	24 1/4	+ 3/4	+3.1
A	DATA PRODUCTS CORP	3- 7	3 3/8	0	0.0
O	DATA RECOGNITION	1- 5	2 1/2	0	0.0
O	DATA TECHNOLOGY	2- 5	3 7/8	0	0.0
O	DIVAN CONTROLS	3- 8	3 3/8	0	0.0
N	ELECTRONIC M & M	3- 8	3 7/8	- 1/4	-6.0
O	FABRI-TEK	2- 5	3 3/8	- 1/8	-3.5
O	GENERAL COMPUTER SYS	6- 16	8 1/2	+ 1/4	+3.0
N	GENERAL ELECTRIC	59- 74	68 1/4	+2	+3.0
N	HAZELTINE CORP	7- 13	6 3/4	+ 1/4	+3.8
O	INFOREX INC	14- 36	18	+4 3/8	+32.1
O	INFORMATION DISPLAYS	1- 5	5/8	0	0.0
O	INFORMATION INTL INC	8- 25	11 1/2	0	0.0
A	LUNDY ELECTRONICS	6- 14	7 1/8	+ 1/4	+3.6
O	MANAGEMENT ASSIST	1- 1	1/2	0	0.0
A	MILGO ELECTRONICS	15- 44	21	+ 3/4	+3.7
N	MOHAWK DATA SCI	8- 27	8 1/4	+ 5/8	+8.1
O	ODEC COMPUTER SYST.	3- 12	4 1/4	+1 1/4	+41.6
O	OPTICAL SCANNING	2- 16	4 1/4	+1	+30.7
O	PERTEC CORP	5- 17	6 1/4	+1	+19.0
O	PHOTON	3- 15	4 1/2	+ 1/2	+12.5
A	POTTER INSTRUMENT	6- 21	6 1/2	+ 1/4	+4.0
O	PRECISION INST.	2- 13	4	- 1/4	-5.8
O	RECOGNITION EQUIP	5- 15	5 3/4	+ 1/4	+4.5
N	SANDERS ASSOCIATES	11- 21	11 5/8	+ 1/4	+2.1
O	SCAN DATA	3- 13	2 7/8	0	0.0
O	STORAGE TECHNOLOGY	17- 39	22 1/2	+2 1/2	+12.5
O	SYCOR INC	7- 11	9	+ 1/2	+5.8
O	TALLY CORP.	8- 15	9 5/8	- 3/8	-3.7
N	TEKTRONIX INC	34- 64	42	+1 1/8	+2.7
N	TELEX	4- 15	5	+1	+25.0
O	WILTEK INC	10- 26	15 1/2	+ 1/4	+1.6
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	5- 9	5	-1 3/4	-25.9
A	BARRY WRIGHT	9- 14	9 1/4	+ 5/8	+7.2
A	DATA DOCUMENTS	17- 26	18 1/2	- 1/4	-1.3
O	DUPLEX PRODUCTS INC	8- 16	9 1/4	+ 1/2	+5.7
N	ENNIS BUS. FORMS	6- 10	6 1/8	- 1/4	-3.9
O	GRAHAM MAGNETICS	15- 27	17 1/2	+1	+6.0
O	GRAPHIC CONTROLS	11- 15	11 1/8	- 1/4	-2.1
N	3M COMPANY	76- 88	85	+5 1/4	+6.5
O	MOORE CORP LTD	42- 57	55 1/2	+ 1/2	+0.9
N	NASHUA CORP	48- 62	53 1/2	+ 3/4	+1.4
O	REYNOLDS & REYNOLD	37- 77	49 3/4	+2 1/8	+4.4
O	STANDARD REGISTER	14- 20	17 3/4	0	0.0
O	TAB PRODUCTS CO	14- 23	18 1/2	0	0.0
N	VARCO	20- 28	20 7/8	+ 5/8	+3.0
A	WABASH MAGNETICS	6- 11	6 1/8	0	0.0
N	WALLACE BUS FORMS	21- 26	23 1/2	+ 1/8	+0.5
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	147-241	238 3/8	+11 7/8	+5.2
N	COLLINS RADIO	14- 27	24 3/8	+2	+8.9
N	CONTROL DATA CORP	43- 78	46 3/8	- 1/8	-0.2
O	DATA GENERAL CORP	39-131	44 1/2	+5	+12.6
O	DIGITAL COMP CONTROL	3- 25	4	+ 3/4	+23.0
N	DIGITAL EQUIPMENT	72-105	88 1/4	-1 1/2	-1.6
N	ELECTRONIC ASSOC.	6- 13	6 5/8	0	0.0
A	ELECTRONIC ENGINEER.	6- 14	9 1/4	+1	+12.1
N	FOXBORO	23- 41	29 1/2	+2 1/2	+9.2
O	GENERAL AUTOMATION	13- 55	43	+2	+4.8
O	GRI COMPUTER CORP	2- 5	1 7/8	- 1/8	-6.2
N	HEWLETT-PACKARD CO	46- 94	91 1/8	+4 1/4	+4.8
N	HONEYWELL INC	106-170	109 3/4	+2	+1.8
N	IBM	333-451	440 1/2	+13 1/2	+3.1
O	INTERDATA INC	8- 16	9 5/8	+ 1/4	+2.6
N	MEMOREX	10- 38	10 1/8	0	0.0
O	MICRODATA CORP	5- 10	8 1/4	0	0.0
N	NCR	27- 38	28 1/8	+1 3/8	+5.1
N	RAYTHEON CO	27- 47	30 7/8	+1 7/8	+6.4
N	SPERRY RAND	30- 50	43 3/8	+ 3/4	+1.7
A	SYSTEMS ENG. LABS	4- 16	5 3/4	+1 1/4	+27.7
N	VARIAN ASSOCIATES	14- 22	15 5/8	+1 5/8	+11.6
N	WANG LABS.	22- 61	23 5/8	+ 5/8	+2.7
N	XEROX CORP	121-172	164 1/4	+7 1/8	+4.5
	LEASING COMPANIES				
A	BOOTHE COMPUTER	3- 18	3 3/4	+ 1/8	+3.4
O	BRESNAHAN COMP.	1- 3	1 1/4	0	0.0
O	COMDISCO INC	3- 18	13 3/8	+1 5/8	+13.8
O	COMMERCE GROUP CORP	5- 11	4 3/4	0	0.0
O	COMPUTER EXCHANGE	1- 3	5/8	0	0.0
A	COMPUTER INVSTRS GRP	4- 14	4 3/8	+ 1/8	+2.9
O	COMP. INSTALLATIONS	2- 5	2	0	0.0
N	DPF INC	5- 13	7 3/4	- 1/4	-3.1
N	DATRONIC RENTAL	2- 4	2 1/4	+ 1/8	+5.8
A	DCL INC	2- 10	2 1/8	- 1/8	-5.5
A	DEARBORN-STORM	16- 26	20 3/4	+1	+5.0
A	DPA, INC.	5- 8	6 3/8	- 3/8	-5.5
A	GRANITE MGT	5- 11	4 7/8	- 1/8	-2.5
A	GREYHOUND COMPUTER	5- 11	5	+ 1/4	+5.2
A	ITEL	7- 12	8	- 1/2	-5.8
N	LEASCO CORP	12- 24	13 3/4	+ 5/8	+4.7
O	LEASPAC CORP	6- 15	6	0	0.0
O	LECTRO MGT INC	1- 4	1 1/8	- 1/4	-18.1
A	ROCKWOOD COMPUTER	2- 7	1 7/8	0	0.0
O	SYSTEMS CAPITAL	3- 20	10 3/8	+1 3/8	+15.2
N	U.S. LEASING	19- 35	26 3/8	- 1/8	-0.4

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



Earnings Reports

BUNKER RAMO
Year Ended Dec. 31

	a1972	1971
Shr Ernd	$.56	$.09
Revenue	252,000,000	224,669,407
Earnings	13,500,000	4,256,573
3 Mo Shr	.20	.06
Revenue	64,200,000	57,929,613
Earnings	4,800,000	1,776,594

a-Preliminary.

COMPUDYNE
Three Months Ended Dec. 31

	1972	1971
Shr Ernd	$.04	$.02
Revenue	7,218,634	5,709,248
Earnings	167,514	131,507

COMPUTER DATA SYSTEMS
Six Months Ended Dec. 31

	1972	1971
Shr Ernd	$.22	$.06
Revenue	1,000,100	659,400
Tax Cred	49,100	10,300
Earnings	115,800	33,000

TELEX
Three Months Ended Dec. 31

	1972	1971
Shr Ernd	$.08	$.02
Revenue	26,542,000	16,629,000
Earnings	862,000	172,000
9 Mo Shr	.22	.28
Revenue	67,486,000	60,870,000
Earnings	2,277,000	2,888,000

AUTOMATIC DATA PROCESSING
Six Months Ended Dec. 31

	1972	a1971
Shr Ernd	$.59	$.41
Revenue	38,580,000	31,177,000
Earnings	3,454,000	2,340,000

a-Restated for pooling-of-interests transactions.

DATA DOCUMENTS
Three Months Ended Dec. 31

	1972	1971
Shr Ernd	$.52	$.45
Revenue	7,847,588	6,610,177
Tax Cred	11,579	13,807
Earnings	242,095	211,166

DATA PRODUCTS
Nine Months Ended Dec. 23

	1972	1971
Shr Ernd	$.18	$.07
Revenue	41,839,000	36,840,000
Disc Op	.....	(135,000)
Tax Cred	494,000	285,000
Earnings	1,209,000	488,000

AGS COMPUTERS
Nine Months Ended Sept. 30

	1972	1971
Shr Ernd	$.19	$.06
Revenue	936,840	808,076
Disc Op	.....	(28,572)
Earnings	81,387	26,685

ELECTRONIC DATA SYSTEMS
Three Months Ended Dec. 31

	1972	1971
Shr Ernd	$.30	$.25
Revenue	27,450,307	21,263,926
Earnings	3,585,504	2,970,952
6 Mo Shr	.57	.48
Revenue	53,528,192	41,735,177
Earnings	6,764,958	5,719,582

REYNOLDS & REYNOLDS
Three Months Ended Dec. 31

	1972	a1971
Shr Ernd	$.30	b$.28
Revenue	15,088,760	13,542,544
Earnings	1,405,431	1,314,507

a-Restated for acquisition of World Wide Time-Sharing, Inc. on a pooling-of-interests basis. b-Adjusted for two-for-one stock split in February 1972.

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- ☐ Model 1200 for speeds up to 1,200 baud.
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- ☐ Friction feed, pin feed or tractor feed.
- ☐ Horizontal tabulation.
- ☐ Vertical tabulation.

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